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OBSERVATIONS

ON SOME OF THE

GENERAL PRINCIPLES

AND ON THE

PARTICULAR NATURE AND TREATMENT

OF THE DIFFERENT SPECIES OF

INFLAMMATION;

BEING,

WITH ADDITIONS, THE SUBSTANCE OF AN ESSAY TO WHICH THE
JACKSONIAN PRIZE, FOR THE YEAR 1818, WAS ADJUDGED
BY THE ROYAL COLLEGE OF SURGEONS.

BY J. H. JAMES,

SURGEON TO THE DEVON AND EXETER HOSPITAL, AND CONSULTING SURGEON
TO THE EXETER DISPENSARY.

> "The knowledge of inflammation, in all its variety of causes, effects, terminations, and method of treatment, may be truly said to constitute the basis of scientific surgery, entering, more or less, into the prevention or cure of every disease which comes under the surgeon's care."—WILSON'S *Lectures*, p. 243.

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TABLE OF CONTENTS.

Page
DEDICATION vii
Preface xi

PART FIRST.

Observations on some of the General Principles of Inflammation.

CHAP. I.

On the Principles on which an Arrangement of Inflammations may be founded . . . 1

CHAP. II.

On the State of Inflamed Parts . . . 19

CHAP. III.

On Sympathy.—The Dependance of Inflammation upon it; and on the Accordance of the General and Local Symptoms of Inflammation . . 40

CHAP. IV.

Page
On some of the Causes affecting the System generally, which influence the Progress of Inflammation . 54

CHAP. V.

On the Purposes and Uses of the different Modes of Inflammation 69

CHAP. VI.

On Mortification 84

PART SECOND.

On the different Species of Inflammation . . 105

CHAP. I.

On Inflammations from Mechanical Injury, including
Observations on Compound Fractures,
Contusions,
Contused Wounds . . 106

CHAP. II.

On Inflammations from Chemical Causes, including
Observations on Inflammations from excessive Heat 127
Cold 132
Poisons . 134

CHAP. III.

On Inflammations from Internal Causes, including
Observations on the Nature of the Organ affected 139-145

Page
Observations on the Causes which produce Inflammations in Vital Organs . 149
Inflammations of Joints . . 157
the Testis . 163
Subacute Inflammations of the Mamma . . . 171
Subacute Inflammations of Lymphatic Glands . . . 172
Phlegmon . . . 175
Furunculus Mitis . . 176
Paronychia Mitis . . . *ib.*
Abscess juxta Anum { in young Persons } *ib.*
Urethram { in young Persons } *ib.*
Furunculus Gravis . . 182
Carbunculous Abscesses, *i. e.*,
Angina Externa . . . 187
Abscess juxta Anum { in advanced Life } 189
Urethram { in advanced Life } 191
Anthrax on the Penis, *&c. &c.* . 192
Carbuncle . . . 195
Inflammations of Absorbents . 197
Veins . . 200
Arteries . . 216
Superficial Inflammations of the Skin . . . 219
Catarrhal Inflammations of Mucous Membranes . . . 226
Inflammations of Cysts of Chronic Abscesses . . . 228
Inflammations of Cysts of Bursæ . 230
Tumors 233
the different Species of Erysipelas 234

Page
Observations on Paronychia Gravis . . 273
Venereal Phagedæna, or Mortification . . . 280
Mercurial Phagedæna . . 285
Mortification of the Labia Pudendi in Infants . . . 287
Mortification from Pressure in unsound Constitutions . . 292
Mortification from the effects of Poverty, Scurvy, *&c.* . 294
Mortification from the use of unsound Rye as Food . . 295
Mortification from Disease of Vessels 296
Table of Inflammations,
Appendix 309

TO

JOHN ABERNETHY, ESQ., F.R.S.,

&c. &c. &c.

MANKIND in general owe a deep debt of gratitude to those who have greatly contributed towards their health, their happiness, and their instruction; and among the many distinguished characters in our profession, who have claims to regard and esteem from such motives, there are few who have deserved them by more extensive, or more useful contributions to that stock of knowledge so essential to their true interests and enjoyments than you, Sir, whom I now have the honour to address; for the principles of medical science which you have advanced, and I may say established, are no less universal in their application, than important in their nature.

If the community are indebted to you in a degree which *they* are hardly able to appretiate, it becomes us to acknowledge, in their behalf, the obligation; and we should ill acquit ourselves if we did not on our own account express that gratitude which we should, and do, feel towards those who give us the means of rendering ourselves more useful to society.

Surgery owes not more to those who have improved it by their talents, their learning, and their exertions, than to those who have raised it in respectability and public estimation by their honourable and upright conduct; and surgeons who feel a just pride in the profession they have adopted, will always regard you as being eminently distinguished in your private, as well as your professional, character, and as offering us an example of proud integrity, no less deserving our respect and imitation than the acquirements with which it is so happily combined.

The Public and the profession *are* grateful to you for your conduct and for your exertions, but I cannot be content with expressing my sense of gratitude as one among many,—an humble member of an important class; but must, as an individual, bear testimony to the value of those precepts you inculcated, and those habits you enforced, to which any little merit this work may possess is greatly owing; and it would be inexcusable in me to omit my warmest acknowledgments for the kindness I have invariably experienced while under your roof, and on all occasions.

In being permitted to dedicate to you the fruit of that knowledge you implanted, I procure for it the sanction of a patronage which cannot be otherwise than useful, and I obtain an opportunity of offering a slight proof of the respect and esteem with which I shall always remain

Your very sincere
and obliged Friend and Pupil,

EXETER, *Dec.* 19*th*, 1820.
J. H. JAMES.

PREFACE.

AS there can be no doubt but that Inflammation and Fever, which are commonly inseparable, constitute, in various forms and different degrees, by far the greater part of those affections which demand the assistance of medical art, so no endeavour to promote the knowledge of diseases of such importance can be deemed superfluous; and, indeed, if we regard the labours of the most eminent men who have adorned our profession, we shall see ample reason to be convinced that no subject has more deeply engrossed their attention. It has, however, been left to modern times to boast a work, which, in depth of reflection, extent of investigation, and actual utility, far surpasses the production of all others, and has, indeed, contributed more to enlarge, and to correct, our views in this, and indeed in every collateral branch of Pathology, than any which can be mentioned. But although Mr. Hunter's work on Inflammation has laid an ample and durable foundation for such an edifice of knowledge as may fulfil all the purposes of science in this department, yet to the superstructure much remains to be added before it can be considered perfect and complete.

Mr. Hunter investigated the general principles of inflammation with peculiar success, but we commit no injustice to his memory in saying, that he has left much for others to do in applying these principles to practice. That much has been effected in this important undertaking by the labours of his cotemporaries, and by subsequent authors, is a fact which we ought gratefully to acknowledge; but in so vast a field there is not merely room still left for gleaning, but ample scope for the best exertions.

Such, probably, was the opinion of the College, when they proposed this as the prize subject for the year 1818,—on which occasion, feeling eager to embrace the opportunity of offering to its notice some views I had been led to entertain thereon, I presented this Essay, and the favourable decision with which it was honoured by such a distinguished body, has emboldened me to lay it before the Public; trusting that the sanction of such authority will justify me in trespassing upon their attention, which otherwise I should have felt very diffident in soliciting. Some alterations and additions have since been made. It may not be amiss briefly to state its objects.

The inquiry into the subject of inflammation divides itself into various branches: for instance, first, as to the state of the vessels and nerves in the part inflamed, constituting the immediate cause of the phenomena we observe. This has at all times been a matter of zealous investigation, and at present is pursued with great ability ; and, as it admits of being examined by direct experiment, it is in this age, perhaps, the favourite object of research. The contradictory opinions, however, which have resulted from the labours of men of high talents would lead us to view the conclusions on either side with some distrust ; and there are many circumstances connected with the nature of microscopical observations, and the differences in the economy of cold-blooded animals the chief subjects of these experiments, which may warrant us in hesitating to receive the doctrines founded upon them without reserve. I have thought it my duty to sum up the facts which the observation of the phenomena of health and disease in the human animal supply, and which seem to oppose the inferences which have been drawn from the former.

Secondly.—The general laws of the economy, and chiefly the phenomena of sympathy, as they relate to disease in general, and to inflammation in particular, as also the circumstances belonging to, or affecting, the individual, which are capable of influencing its progress and results: such are, the state of the digestive organs; of the nervous and vascular systems; the age and sex of the person; and the effects of temperature, atmosphere, and habits. This is so extensive and various a field, that to do it justice would require the undivided efforts of any individual, however gifted. There can be no doubt of the great utility of such an investigation; and it has never yet been fully and methodically entered upon with reference to inflammation. I cannot profess to do more than offer a mere outline; so much, however, was necessary, as an Author ought to put his Readers in possession of his opinions on general principles.

Thirdly.—The objects of inflammation in the animal economy; the phenomena which it exhibits; the effects which it produces; and the products which it affords. It is in this department that we are so truly rich from the labours of Mr. Hunter and other eminent pathologists. I have been led to give a brief sketch of some of the leading points which demand attention in these two last branches, partly with the view of introducing some remarks and suggestions, which, though not of much importance, are yet, perhaps, deserving brief mention.

Fourthly.—The *general* principles of treatment.

These have been so ably considered by various modern authors, that it would be superfluous to enter into this branch, and I have therefore avoided it altogether.

Fifthly.—A particular arrangement of the different kinds of inflammation, I am justified in saying, is very much wanted; and it has been a principal object of my endeavours in this Essay to effect this.

On the advantages of arrangement and classification, generally speaking, it is unnecessary for me to expatiate; the question here is, whether the nature of diseases will admit of it? "Clear and precise definitions of disease," says Mr. Pott, "and the application of such names to them as are expressive of their true and real nature, are of more consequence than they are generally imagined to be: untrue and imperfect ones occasion false ideas, and false ideas are generally followed by erroneous practice*."

The general nosological systems we possess seem to have failed in their object, if they have not induced positive error in many instances; but this may have arisen from the difficulty of establishing a classification of the whole range of diseases in the present imperfect state of our knowledge. It has been admitted on all hands, that the discriminating and accurate practice lately introduced in some departments, as in those of the Eye and Skin, is mainly owing to the perspicuous and scientific manner in which this has been done. The attempt to establish more systematic views in the present important division, is, I believe, at least justifiable.

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* Vol. iii. p. 43.

I do not mean to assert that there are not arrangements of inflammation in existence, proposed even by authors of celebrity, yet that those which preceded Mr. Hunter were deemed unsatisfactory by him, may be concluded from his having omitted all mention of them: that he did not apply himself to remedy the defect, is, indeed, much to be regretted. No others have been since offered, which are entitled to command our attention, as appears to have been the opinion of an Author of late date and acknowledged authority*.

The principles on which the various divisions and sub-divisions here offered have been formed, are simple, and I believe true; whether they will suffice must now be submitted to the judgment of others. They have been deduced from permanent and important differences observable in the characters and progress of the various kinds of inflammation, which we must suppose to depend upon differences in their nature; and if so, will require a suitable modification in the treatment.

Sixthly, and lastly.—To consider the peculiarities of each inflammation, and to indicate the principles of treatment particularly adapted to it. In all modern works, and for the most part in those of more ancient writers, the views of inflammation which have been given are, as it appears to me, too general; and this observation also extends to treatment which has commonly been laid down under certain heads; such as the antiphlogistic plan,—bleeding, cold, *&c.* It seems, however, important to specify exactly the case in which one mode, or one remedy, is more likely to succeed than another. It is this kind of knowledge which is acquired by practice; but in commencing the profession, a surgeon has to obtain it at the risk of the patient's health and his own discomfort, and experience alone sets this matter right; whereas, where the differences in diseases have been discriminated and enforced, we find a facility in our treatment which is delightful, an advantage we owe to those who have digested for us that knowledge which would have cost us years to gain even imperfectly.

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* Dr. Thompson.

In the execution of this part of the work, I have endeavoured to be as succinct as possible, it having been my purpose to shew the connexion between the nature of the remedies employed and the disease treated; but, not to dwell upon those, which are familiarly known and commonly recognised; in some instances I have gone into longer discussion where there appeared to be occasion from the importance of the subject; from the doubtful nature of the opinions at present entertained respecting it, or from its not having received what may appear a due degree of notice, more particularly if the remark applies to those works which are in the hands of most readers. On the subject of mortification also I have occupied more space and time, because I believe it will not be disputed, that there are few points in pathology so open to discussion, or whose importance so much demands it.

I have not entered into the subject of internal inflammations and of the external, I have avoided those which depend upon a diathesis, such as the scrofulous, rheumatic, gout, *&c.*

Thus much I have thought it necessary to premise relative to the plan of this Essay: its execution, I fear, needs all the extenuation, and all the apology I can offer for numerous defects and errors. As a systematic work it would be much too concise on many points; it does not pretend to such a title, for until the judgment of the Profession has been pronounced on it, it would be wrong to encumber it with details, which are already before the public by the labours of far abler hands than mine. At the same time it is in many respects too full for a mere outline. Viewed in this light, it may displease many to find it setting before them that which they already know from better sources: it was necessary, however, to throw the observations I had to offer into some form; or to produce them as the insulated passages of a common-place book, a procedure too novel for me to attempt: besides, it was not inconsistent with my avowed design, to sketch out a plan of the various kinds of inflammation, and to comment on them as I proceeded. To execute this, however, in a manner free from objection, and calculated to meet the expectations of all classes of readers, would be particularly difficult.

I may have exposed myself to the suspicion of wishing to appropriate the opinions of others by not acknowledging them; or to censure for not having ascertained their rightful owners. I know that in mitigation of this blame, I might plead the common practice of modern times; but I would rather say, that I have no wish to be thought the original proprietor of more than shall by others be adjudged to me, and only hope that this may be deemed sufficient to warrant the intrusion of myself on their attention.

I have with some freedom, but I hope also with diffidence and scruple, objected to the opinions of others, where they have appeared to be founded on insufficient grounds, let those opinions be what they may; being convinced that "nothing has been so great an obstacle to the improvement of science, as the partiality or obsequious regard which men have been apt to pay to great authorities*;" nor can I believe that it is to be wanting in respect to our predecessors, or in deference to our cotemporaries, to do so; "for being in search of truth, I know they will with pleasure embrace every unprejudiced attempt to discover it†."

When an author has to advert frequently to the opinions of another, and perhaps for the purpose of expressing his dissent from them, it carries an ungracious appearance; if, however, this matter is considered as it ought, it will on the contrary be found to be a proof of deference to which they are entitled; for, in any discussion, it is only incumbent on us to consider those works whose merits particularly command our regard; and as it is unnecessary to produce our authority where all are agreed, so it is only for the purpose of expressing our doubts that this is to be done. In the following pages it will, I trust, be rather considered as a testimony of the respect which I very unfeignedly feel towards those who have furnished me with the means of endeavouring to cultivate for myself a small corner of this spacious and fruitful vineyard.

---

* Leake on *Child-bed Fever*. Preface, p. 17.

† Kirkland. *Med. Sur.*, vol. i. p. 249.

ON INFLAMMATION, &c.

PART FIRST.

CHAP. I.

ON THE PRINCIPLES ON WHICH AN ARRANGEMENT OF INFLAMMATIONS MAY BE FOUNDED.

On the advantages of Arrangement in every science, and the possibility of effecting it in the Medical.

THERE can be no question that in the study of every science, a just arrangement will greatly facilitate the acquisition of knowledge, as well as enable us to recollect what has been learnt, or refer to what we wish with greater readiness, and will probably lead to more correct and enlarged views respecting its various branches. It is one of the principal objects of this essay, to *attempt* such an arrangement, in that extensive and important department of medical science, which comprehends the various kinds of Inflammation: but I have not only to apologize for my own inability to execute this task, as it ought to be; but to urge, as an excuse for the imperfections, which no doubt will appear numerous in the eyes of a strict classificator, accustomed to the exactness which may be obtained in natural history, that, from the want of

Difficulties.

permanence in the characters of diseases; from their liability to be affected by a variety of circumstances, from which the subjects of natural history are exempt; from the essential differences in their nature, from any of these subjects; as well as from the peculiar difficulties which oppose our observations; the same precision is not to be attained in forming our divisions, which in them is so admirably supported throughout.

It is, perhaps, to be regretted that nosologists have adopted the same terms for this purpose as those employed by the naturalist; for, from the dissimilarity of the objects, the conditions necessary for classification can hardly be strictly fulfilled. Since, however, custom has sanctioned the mode, it must be my endeavour to overcome the difficulties in the best manner I can.

Principles of Classification

It is required, I apprehend, for systematic accuracy, that each class, each order, each genus, and each species, should possess certain characters peculiar to themselves, but that each species should possess the characters common to its genus, and those which are common to all the other genera of its order; while the orders themselves possess the peculiarities which distinguish their class from any other. The classification which is now submitted will, I hope, meet, in a considerable degree, these conditions. It has been founded on principles which constitute very important differences in the nature of inflammations; and whatever judgment may be held respecting the arrangement proposed, I may flatter myself some advantage will arise, from soliciting the attention of my readers, more particularly than has hitherto been done, to points of much consequence in a practical, as well as in a scientific point of view; for if differences exist in the nature of diseases, they will require corresponding differences in the treatment; and if we do not understand the principles on which they depend, the treatment will be empirically, and therefore often erroneously directed; and, in *external* diseases, empiricism, in the full meaning of the term, is rarely justifiable.

Before proceeding to explain the principles of the arrangement I have to propose, it may not be amiss to offer a cursory statement of the modes of dividing or arranging the subject, now in use.

Modes in which Inflammations have been arranged.

1*st*. We find inflammations treated of as acute, subacute, or chronic; but these are merely different stages of the same disease, in many instances.

As acute, subacute, and chronic.

2*dly*. As the adhesive, suppurative, ulcerative, or gangrenous; processes which cannot be too attentively considered, but they are merely modes of termination, often of different kinds, but sometimes of the same: to a certain extent they will afford a basis of distinction, but to me it seems that this is only in as far as they constitute a groundwork for *subdivisions*, as will be hereafter explained.

As phlegmonous, erysipelatous, and gangrenous.

3dly. As *phlegmonous*, *erysipelatous*, or *gangrenous*.

Under these titles, diseases of the most opposite nature, and requiring the most opposite treatment, have been indiscriminately brought together. And supposing no objections occurred to the titles (a point which will be hereafter considered), would a division into three kinds be sufficient? Is it not looking at this numerous class of diseases in too narrow a point of view? Are we to treat them upon principles derived from such a limited consideration? Is not this contenting ourselves with ideas at once too general and too vague?

A separate division under the title of gangrenous inflammations is hardly to be admitted. For how are we to limit them? Many of the diseases which would be included under the head of phlegmonous and of erysipelatous inflammations, terminate in gangrene; some inevitably, others only incidentally. Are they all to be called gangrenous? Are the classes of phlegmonous and erysipelatous inflammations to be robbed of them at one time and not at another? or how are they to be definitively arranged? The disposition to terminate in gangrene will afford a basis for subdivision, but not for a primary separation.

As peculiar in each of the elementary tissues.

Another principle of arrangement has been proposed, for which we are indebted to Dr. Carmichael Smith in this country, and to Pinel, and Bichat, on the Continent, namely, that of referring them to the elementary tissue in which they occur. These tissues being five in number, and this doctrine supposing that the inflammation of each is essentially different; that of the first, which is the cellular membrane, including the parenchyma of the various viscera, is considered phlegmonous; of the second, serous, from the membranes in which it is seated; of the third, mucous, I suppose for the same reason; of the fourth, which is the skin, erysipelatous; and of the fifth, rheumatic, belonging to the fibrous membranes.

That inflammations differ *materially*, from the circumstance of their affecting one of these elementary tissues rather than another, is a fact not to be questioned;—but I believe the doctrine, when carried to the extent stated above, is pushed beyond what it will bear. That I have not overstated the case, will, I think, be conceded to me, when I quote the following passage from a late and very able expositor of these doctrines: "It has been suggested, that is to say, that there may be differences in the nature of inflammatory action; that the same set of vessels may at one time be in a state of phlegmonous, and at another, of erysipelatous, inflammation. This *refinement* appears to be unnecessary*."

This system is liable to the following objections, fatal if true; namely,

1*st*. That different kinds of inflammation are liable to occur in the same tissue. 2*d*. That the same kind of inflammation is often met with in different tissues. 3*d*. That the same inflammation shall be transferred from one to another: a position, I must grant, less susceptible of direct proof than the two former; but either are sufficient for my purpose.

1*st*. That different kinds of inflammation are liable to occur in the same tissue.

IN THE SKIN there are erysipelas, the various exanthemata, and other cutaneous diseases, particularly ecthyma, which approaches to boil: we have those tumors still more analogous, called pinswells, and various other forms, as from blisters, scalds, poisonous substances, chilblains, mechanical injury, *&c.*, which are not erysipelas, and which are not identified, because we choose to call them erysipelatous.

2*d*. IN CELLULAR MEMBRANE. Besides true phlegmon, we meet with boil, carbuncle, erysipelas, scrofulous abscesses, *&c.*; affections differing widely from each other.

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* Gregory's *Elements of the Practice of Physic*, Vol. i. p. 190.

3d. MUCOUS MEMBRANES, it is admitted, ulcerate in one part, effuse lymph in another, and secrete pus in a third; they are the subjects of catarrh, dysentery, angina, croup, of *various forms* of inflammation of the bronchiæ and intestinal canal, described by Badham, Hastings, Abercrombie, and others.

4th. SEROUS MEMBRANES are liable to inflammation of sthenic and asthenic type, if not to rheumatism; it is not always the *same.* There is, I conceive, no distinct *serous* inflammation, as has been maintained.

5th. IN FIBROUS STRUCTURE we have rheumatism, gout, syphilis.

Enough, I think, has been stated: the question lies in a narrow compass;—the tissues are five; are there more than five species of inflammation or not? If there are, one tissue must be liable to more than one, and of course there is an end of the doctrine. As far as it properly goes, the theory is valuable, but it has, I conceive, been pushed beyond proper limits; nevertheless, in opposing such authority, I feel great comfort in sheltering myself behind that of Mr. Hunter, who says, (Vol. I. p. 473.) "It has been supposed that the different species or varieties of inflammation arise from the difference in the nature of the part inflamed: but this is certainly not the case; for if it was, we should soon be made acquainted with all the different inflammations in the same person, at the same time, and even in the same wound. For instance, in an amputation of a leg, where we cut through the skin, cellular membrane, muscle, tendon, periosteum, bone, and marrow, the skin should give us the inflammation of its kind, the cellular membrane of its kind, the muscles of theirs, the periosteum, bone, marrow, *&c.*; of theirs; but we find it is the same inflammation in them all."

2d. That the same kind of inflammation is often met with in different tissues*.

Besides the striking instance just quoted, I may observe, that the skin, mucous membranes, glands, periosteum, bone, *&c.*, are liable to inflammation from syphilis; almost every structure in the body from scrofula; the urethra and bladder, if not the bowels, are sometimes affected by rheumatism. The inflammation in the diathesis of measles, small pox, erysipelas, *&c.*, may fix upon serous or mucous membranes, as well as skin, and often, if not generally, does so.

3d. They are often transferred from one tissue to another.

It is maintained, that when this happens, the new inflammation is different from the other. Upon this head we may observe, that proof cannot be obtained, because the organ so affected is generally internal; or if not, its structure is so different, that inevitably the form must vary. Thus, if inflammation is transferred from the urethra to the testis, it is not gonorrhœa there; nor, if the reverse happens, is it hernia humoralis;—so, if erysipelas receding affects the brain, it may not actually be erysipelas, whose characters have been defined from its appearances in a different organ. But the inflammation, I conceive, is as analogous in its nature to it, as circumstances will permit, and differs in its nature from inflammation of the *same* organ arising from other causes. If inflammation recedes from an external organ, and attacks one internal, there doubtless will be a material change in the *constitutional sympathies*, and a proportionate alteration in the *treatment* will be required; but *this* may be explained from the greater importance of the part. If the doctrine alluded to were true, then it would be sufficient, that any given tissue were inflamed, for its nature to be the same: a position so irreconcileable with facts, that its advocates admit that the cause may modify it; if it does so, this modification may be so material, as to throw the influence of the texture into the back-ground,—and for this I contend.

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* This position is, as it were, the converse of the first.

How far Mr. Hunter has arranged inflammations.

There is great reason to regret, that Mr. Hunter, to whom we owe by far the greater part of our valuable knowledge in this branch of pathology, and whose strong discernment and able illustration of its general principles evince a degree of acuteness in investigation and profundity in judgment which are, perhaps, hardly equalled, should not have bent his powerful mind to any endeavour at a more systematic mode of arranging its different kinds than that I have now to mention. From a careful collation of the different parts of his immortal work, the following passages may be selected as affording a brief sketch of his sentiments on this head.

"Inflammation may first be divided into two kinds, as first principles, *viz.*, the healthy and the unhealthy."

"The healthy probably consists only of one kind, not being divisible but into its different stages, and is that which will always attend an healthy constitution or part."

"The unhealthy admits of vast variety (diseases being almost numberless) and is that which always attends an unhealthy constitution or part."—Vol. i. p. 442 *.

"The body may be divided with respect to inflammation into two orders of parts; the first, the cellular membrane, or the body in general, together with the circumscribed cavities."—P. 424, 444.

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* Edit. in 8vo., by Mr. Travers.

When inflammation takes place in this order, it is generally the adhesive, but the suppurative or ulcerative may follow.—445. Deep-seated parts are more prone to the adhesive; those nearer the surface to the suppurative.—414, 416, 421. Violence of inflammation leads to suppuration.—415, 440. Also there may be an original disposition to suppuration, which Mr. Hunter considers erysipelatous.—446.

The second are all the outlets of the body, 444; which are prone to the suppurative, but the adhesive may follow, and violence of inflammation in them leads to the adhesive.—P. 424, 446.

"The term or idea of inflammation may be too general, yet it is probable that it may form a genus in which there is a number of species, or it may be more confined in its classification, and be reckoned a species containing several varieties."—Vol. i. p. 467.

"So far as it appears to be necessary to take notice of the different inflammations as illustrative, they may be comprehended in five divisions; although I must own, that if we take in all the specific diseases which produce inflammation, such as the venereal disease in its different forms, the gout, *&c.*, they may be without number."—P. 467.

"The present, *viz.*, the adhesive, with its different effects as suppuration, I shall consider as one; the œdematous which comes nearest to the adhesive, forms a second division; the erysipelatous, the carbuncle, and that which leads immediately to mortification form a third."—*Ibid.*

The inflammations of which Mr. Hunter gives any thing like a particular description (excepting those admirable disquisitions on the adhesive, suppurative and ulcerative) are

A kind of inflammation like chilblains, arising from irritable debility.—467-8.

Gout.—468 *et seq.*

Inflammation of the absorbents.—472, 485; and in the *Transactions of a Society for the Promotion of Medical Knowledge*, there is an excellent paper on inflammation of veins.

Œdematous inflammation.—474.

Erysipelatous.—475.

Carbuncle.—481.

And of inflammation with tendency to mortification, he speaks.—483.

That Mr. Hunter, had he endeavoured, would have effected an arrangement of inflammations of the most useful, as well as scientific kind, cannot be doubted;—that the above is entitled to such a character can hardly be said even by his warmest admirers; and I much question, whether it was his object, for p. 473, he says, "I do not mean to treat of these, but in a *general way*, not even when considering the method of cure." Every thing which he has left us commands our respect so strongly, that I should not feel myself justified in proposing any new mode, without previously making it appear that we are not precluded by any thing he has done. In Appendix, No. 1, will be found the chief heads under which other authors of celebrity have divided the subject, and the names of the species they have described. I shall now proceed.

Other Authors.

The arrangement of inflammations here proposed is founded upon the following facts:

1*st*. That the mode of repairing injury, and of arresting the progress of inflammatory diseases, depends upon the power which the animal œconomy possesses of effusing organizable lymph. If this exists in any given case, in a sufficient degree, the progress of the inflammation will be *limited*; if the contrary, it will *spread*.

Plan now proposed rests upon, first,

The disposition to limit inflammation by the effusion of lymph which gives the class.

And the danger of the disease being in proportion to the disposition to spread *cæteris paribus*, more constitutional sympathy, denominated sympathetic fever, will be excited.

And this sympathetic fever, however salutary in its nature, will, when it exceeds certain bounds, tend to augment rather than lessen the mischief.

The disposition to spread may be owing either to the nature of the part, as a surface; of the cause, as a poison; or to the state of the constitution;—but the former are circumstances more or less *accidental*, and though very important, cannot afford a basis of distinction: but the latter, as a *permanent* cause, certainly will, and when it is similar in nature and degree, and accompanied with the same concomitants, it will be found to produce the same effects; and there is no inflammation in which the disposition of the constitution does not tend either to produce its limitation or the reverse. These concomitants are very various, as we shall hereafter have occasion to specify.

The disposition then to *limit*, or to *spread*, will afford the ground-work, by constituting two great classes of inflammations. It may be said, perhaps, that it would be as well to designate them by the old titles sthenic or asthenic, or by the terms phlegmonous and erysipelatous. It is not, however, difficult to shew that either of these are liable to strong objections.

The terms sthenic and asthenic might probably be employed with reference to internal inflammations without any obvious disadvantage: but a system to be tolerably perfect, should apply generally. Now, if we were to extend these designations to external inflammations, we should often find ourselves involved in difficulties which, in their consequences, amount to more than technical errors; for example, in classing erysipelas, can it be considered as an inflammation of the sthenic type?

Is it not generally the reverse?—Can we class it as asthenic?—Would not this lead to a very erroneous consideration of the purer kinds of erysipelas phlegmonodes?

The objection to this mode by no means rests on the support of this example only; but many others might be adduced. Now, by taking the disposition to limit or to spread, as the leading mark of distinction, we do not imply the necessity of *treating* them sthenically or asthenically; we merely recognise a prominent character, which ought to have a material influence over our conduct, and in the case of external inflammation I should strongly contend for the utility of doing so.

The objections to employing the terms *phlegmonous* and *erysipelatous* are not less weighty. As phlegmon and erysipelas, are names now given to definite forms of disease, we naturally connect the idea communicated by the adjective phlegmonous with the disease which we entitle phlegmon, and so of erysipelatous. Now, if we were to include all the inflammations, whose disposition it is to be limited, under the former designation, we should ally with phlegmon those which are exceedingly dissimilar in nature, as for instance, mumps and carbuncle; and in the same way, if we called all those inflammations erysipelatous, whose disposition it is to spread, we should confound with erysipelas a variety of affections of the skin, of the vascular system, *&c.*; we should have even paronychia gravis, whose seat is essentially *beneath* the skin, while erysipelas is more particularly resident in it. These and other examples are, I conceive, sufficiently strong to prove that such terms as these are liable to the very weighty objection of confounding together diseases essentially different in nature, while, by the mode now suggested, this is, as far as I can see, entirely avoided.

Secondly, the degree of connexion with vital organs, which gives the Order.

Secondly. THE DEGREE OF CONNEXION OF THE ORGAN WITH THE VITAL FUNCTIONS OF THE ANIMAL, is another cause which exerts a predominant influence over the character of the inflammation; acts invariably, and *cœteris paribus*, in the same degree; the constitutional sympathy being in proportion to the danger, the difficulty of resisting that danger, and of repairing the mischief done. On this principle I would form the Orders.

Thirdly, the disposition to terminate in one mode rather than another, which gives the Genus.

Thirdly. There is a circumstance in the history of inflammations which has hardly received a *due* share of attention, but it is both sufficiently remarkable, and very important; namely, the original disposition to terminate in one mode rather than another: thus, in boil and whitlow, it is to suppurate; in carbuncle to slough; and in mumps to resolve; and this disposition is so strong, that it is very difficult to procure any other termination. It may happen, however, that there shall be more than one mode in which it is disposed to terminate; as in either resolution or suppuration in sphacelus or ulceration, and so on. On this principle I have grounded the establishment of the Genera: whether it will fulfil the expectations of a strict classification, is more than I can pretend to answer for; but of the practical importance of the principle I feel little doubt, or of its not having hitherto been carried to the extent it will admit.

These general principles will afford, perhaps, a sufficient basis for such an arrangement as shall be both natural and useful in its application to all kinds of common inflammation. There are some which are so peculiar in their nature that I do not wish to apply it to them, nor is it necessary; they stand alone: such are gout, rheumatism, scrofula. With respect to inflammations arising from external injury, they are more simple in their nature (though amenable to the same laws as others) and inasmuch as they may take place in sound constitutions, and are accompanied with disorganizations which do not exist in the others, they differ materially. I have included a short account of them in this sketch.

After the foregoing remarks, a reference to the table which I have added, will, perhaps, suffice to explain my plan, and what further observations I have to offer will be better introduced in their proper places when the subject is more particularly discussed.

CHAP. II.

ON THE STATE OF INFLAMED PARTS.

SECTION I.—*On the Local Symptoms.*

THE obvious symptoms of inflammation are redness, heat, swelling and pain*, varying much in degree and kind.

Symptoms of inflammation.

The *redness* is an universal symptom, and arises from a larger quantity of red globules being contained in the vessels of a part.

The shade of colour varies according to the proportion of blood possessing arterial or venous properties, or the addition, perhaps, of other fluids, as bile, *&c.*

The *heat* may, by rational analogy, be explained, on the supposition that the actions of the part are increased, whether of its nervous or vascular system, or both; for it probably proceeds from an increased excitement of the former, supported by an increased circulation in the latter.

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* Mr. Wilson, I think, only considers redness and swelling as essential. Certainly, the other symptoms are not constantly present, but I never saw an inflammation in which the part preserved its *natural* temperature. There are some in which it is cold, or, more often, alternating from cold to heat; and with respect to pain, I believe uneasy sensation, more or less, is invariably present, unless when intercepted by paralysis.

Observations on the heat of inflamed parts.

The sensation of heat is to be distinguished from its formation; it seems to be increased, whether the actual heat be so or not, and in no proportion to that, and is very remarkable in gangrene, in which the nerves are undergoing destruction. In some degree it may be owing to the great increase of the sensibility from which any given cause will produce an increased effect, and hence an ordinary temperature will give *pain*. It has been maintained that parts which naturally do not perceive heat do not when inflamed; that the mode of pain in disease is analogous to the mode of sensation in health: but this is not to be admitted without reserve; for the pleura gives the sensation when inflamed, and in enteritis it is excessive.

The *pain*, it may be presumed, is a consequence of an unnatural impression being made on the nerves; but the mode of pain will vary according to this impression, which depends upon the nature of the cause, the part, the kind, and stage of inflammation.

On the pain.

It has been explained by the sudden tension of the nerves, from the swelling, or the pressure made upon them in unyielding parts, but then it should be in proportion to this tension or pressure, which it is not. The pain in the inflamed pulp of a carious tooth which is not pressed upon, is as great, or greater, than in the periosteum which is. The pain in the free mucous membranes of the intestines is often as great as in the pleura. There is often little pain in large soft nodes, thrown up in a day or two, and a great deal in small hard ones, which are long in forming. Besides, this will not explain the peculiarity of pain;—why it should be sharp in the pleura, burning in the skin, and aching in fibrous membranes.

Uses of pain in a physical point of view

Before we make up our minds on this point, it may not be amiss to inquire what is the object of pain being felt at all. We can hardly suppose the benevolent Author of our being would allow it without some useful purpose; and, without any disposition to question its necessity in a moral sense, I should also be inclined to affirm, that, in a physical it has its uses,—nay, is indispensable. By it alone, in many instances, we are warned to avoid injurious impressions; and I would ask how the extreme sensibility of the sole of the human foot can possibly be accounted for, unless it were to guard the individual, particularly in the state of nature, from incautiously inflicting a wound, by placing it in a dangerous situation? and I would beg further to suggest *how frequently* such mischief is incurred when paralysis has deprived the person of this necessary gift. Now, to apply this to the present purpose.—In a state of health there would be no advantage in that important part of our system which Bichat has termed the *vie organique*, communicating any impression to the sensorium, but the contrary. In disease,—in inflammation, however, were this not the case, we should proceed, without any intimation of our danger, to do that which would prove inevitably destructive. The property of communicating pain, therefore, is beneficially imparted to all parts of the body; but it is hardly capable of being explained by any reference to the size of the nerves, or any mechanical affection of them.

The *swelling* is found to arise partly from the vessels being more distended with blood, and partly from the matters which are separated from it into the cells of the cellular membrane, namely, lymph, serum, or other substances.

The throbbing has been accounted for on the supposition that it arises from the inflammation being situated in the neighbourhood of arteries of a size sufficient to pulsate,—for example, in the cellular membrane. This explanation, however, will not suffice, for there are frequent instances of abscesses forming in cellular membranes without any sensation of the kind. I have had reason to know this from my own personal experience, in an acute abscess consequent on inflamed absorbents*.

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* As the account in these and the following pages, of the phenomena of inflammation will be found to be very incomplete, I must beg leave to refer the reader to the preface for the reasons which have induced me to avoid going into detail.

SECTION II. *On the supposed Final Causes of Inflammation.*

Greatly depends upon the state of the vessels, and will probably remain in obscurity until their functions are better understood.

THAT the vessels are materially, and, indeed, principally, implicated in producing it, must be granted*; and also, that we are not very likely to arrive at any very precise notions of their state and functions in inflammation, unless we are acquainted with them in health, which is so far from being the case, that there is, perhaps, no point in physiology more involved in obscurity. This being so, doubts may arise whether it would not be the most prudent plan to avoid the discussion altogether; and this opinion will receive further strength from the mortifying fact, that although men of the most exalted abilities and enduring patience have been engaged in the inquiry, it can hardly be considered to have led to any useful result.

The practical inferences which may arise from the doctrine of debility render some inquiry into this subject necessary.

Under these circumstances, I should feel inclined to sit down contented without further investigation, if it were not manifest that the doctrines, now maintained with great ingenuity, and founded upon much research, seem to lead, in their *practical application,* to inferences, which are at total variance with what I conceive to be the right treatment of the majority of inflammations. For if it is granted, that it depends upon debility of vessels, by consequence it would follow, that it should be our endeavour to counteract this debility.

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* It is by no means intended to exclude the influence of the nerves—equally obscure—but what there is to be said on that subject will be mentioned under the head of sympathy.

I do not pretend to be able to disprove those facts which have been stated, nor am I entitled to doubt them;—but I may be allowed to hesitate before I admit their full application to the phenomena of inflammation in the human subject; and that because they appear to be opposed by a number of *other facts,* not less certain or important; so that, in the present stage of the inquiry, I should feel it the wisest plan to suspend any positive judgment, confessing my own belief to incline to that view of the subject which considers it to depend upon increased action.

No one can respect more than I do, the abilities of those gentlemen who have of late years been engaged in the inquiry, especially Dr. Parry and Dr. Thompson, on the one hand, and Dr. Philip and Dr. Hastings, on the other, as they appear to have spared no pains to inform themselves, and to complete what the ability and industry of Haller left unfinished; but with regard to the conclusions to be formed from their experiments, every one must judge for himself, and that from a survey of *all* the facts. I shall now cursorily state those which seem to militate against the doctrine of debility.

First, to revert to the point whence I set out, there is much reason to doubt whether the opinions entertained with respect to the functions of the blood-vessels are rightly understood; and if not, the argument will be liable to be affected in many of its branches.

Does the heart by its sole powers circulate the blood? If not, how far do the arteries, the capillaries, or the veins contribute? Or what are their respective offices? In a paper which I did myself the honour of presenting to the Medico-Chirurgical Society in the year 1818, I commenced this inquiry. It would here occupy too much time to repeat what was then said; but I may state some of the conclusions.

The heart not the exclusive agent in the circulation.

The heart, it may be inferred from many facts, is not essential to the circulation, at least for a time it may be carried on without, though imperfectly; and it may be presumed that it does not *alone* support it in the human animal, under ordinary circumstances.

Reasons for believing that the blood is not propelled by the Arteries.

Since, then, some other power is to be found to do this, the question is, where does that reside? It is maintained that the arteries contract to propel the blood: but if so, either they must contract together, or at different times; if together, they must either do so at the *same* time as the heart, or *alternately* with it; if at the same time, this would prevent the blood from flowing into them at all; if alternately, that would maintain the pulsatory action in the veins, whereas this is of rare occurrence. There is another mode in which they may be supposed to contract, namely, in succession, like an intestine; but as far as I have ever been able to find, both the dilatation by the impulse of the heart, and the contraction by the *consequent* exertion of the *elasticity* of the artery, are in immediate succession, and occur at the same moment, at any distance from the centre, which is at variance with this supposition; and as the elasticity of the arteries diminishes, so as to be almost imperceptible in the smaller branches, in them the pulsatory motion is gradually lost; whereas, if the contractile power operated, it would be continued, nay increased, as *their* contractile powers are stronger than in the larger vessels. Hence, as well as for many other reasons too long to specify here, I should be led to believe that the circulation is not maintained in any degree by the muscular contraction of the arteries; and I also believe that their power of contraction is given them for another purpose, quite sufficient in importance, namely, to *regulate* the quantity of blood conveyed through them to any part, or to the whole.

It is probable the capillaries contribute materially.

It is unnecessary for me here to detail the reasons which induce the belief that a power of propulsion resides in the capillaries; but as the opinions which have been formed respecting the state of the vessels in inflammation have originated in some considerable degree from the notions which have been entertained respecting this power in the *arteries* also, it was necessary that I should express my dissent in this particular.

Boerhaave's Theory.

Now, with respect to the state of inflammation, we are to consider the various theories which have been advanced. The famous one of Boerhaave has been abandoned: we do not believe either in spissitude of the blood, or in error loci; instead of error loci, it is clearly a natural provision that red globules should be sent to the vessels, which are to repair injury; and instead of the blood being thicker, it is in inflammation manifestly thinner. Dr. Cullen supported the doctrine of spasm, which bears more appearance of probability: but though spasm, or a state analogous to it, often accompanies inflammation, yet the objects of inflammation in the œconomy could never have been accomplished by it; and as inflammation in the case of external injury *is* a *natural* process set up for its repair, it can hardly be supposed to consist in a state which would

Cullen's.

render repair impossible. It is probable that Dr. Cullen was led, from habit, rather to turn his attention to one view of the subject, and to disregard those phenomena which the *effects* of *injury* would produce, and which clearly would lead to opposite conclusions from those he has deduced from the consideration of spontaneous inflammations.

Theory of debility of vessels.

Of Vacca, Lubbock, and Allan, founded on an unproved hypothesis.

We have next to consider the theory of debility and diminished circulation in the vessels belonging to the inflamed part, as maintained by Vacca, Lubbock, Allan, Philip, and Hastings. The opinions of the three former rest chiefly on the hypothesis that the arteries propel blood; and before it can be admitted, it is necessary that this power of propulsion in the arteries should be proved; it is not sufficient that an artery will contract—that it will contract under the application of a stimulus; it should be *proved that, under ordinary circumstances, it does propel the blood.*

Observations and arguments of Dr. W. Philip and Dr. Hastings.

We then come to the *facts* stated by Dr. Wilson Philip and Dr. Hastings; namely, that on the application of stimuli to the vessels of the web of a frog's foot, in a large number of instances which were observed, the arteries, capillaries, and veins, were found, after a short time, to enlarge, and the blood to flow more slowly through them; which they attribute to debility.

Microscopical observations and analogies between the lower and higher orders of animals not to be perfectly relied on.

In the first place, facts resting upon microscopical observations are liable to mistrust; in the second, analogies between the higher and lower orders of animals, the chief subjects of these experiments, cannot be deemed conclusive.

The facts observed are as follow: On the application of stimuli of various kinds to the webs of the feet of frogs, at first the vessels were observed to contract, and the velocity of the blood's motion to be increased. After a time they dilated, and became much fuller, and the motion of the blood was lessened, became oscillatory in some instances, and in others was stopt altogether, still retaining, however, its arterial appearance*, even for days. In the neighbourhood of the part inflamed, the motion of the blood was observed, in some instances, to be natural†. The following quotation will express the opinions of Dr. Hastings, which may be considered as agreeing with those previously expressed by Dr. Philip.

"In the course of this inquiry it has been shewn that the healthy circulation of the blood essentially depends on a due degree of action in the vessels throughout the system. It has also appeared that the application of stimuli, whilst it increases the action of the vessels, produces none of the symptoms of inflammation. When, however, the excessive application of these stimuli has impaired the excitability of the small vessels, the phenomena of inflammation are fully manifested; and when their excitability is restored, the inflammation subsides. It may be logically inferred, therefore, that inflammation consists in a weakened action of the capillaries, by which the equilibrium between the larger and smaller vessels is destroyed, and the latter become distended."—P. 99.

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* Hastings on *Inflammation*.—P. 83, et alibi.

† I am giving the statements of the supporters of the doctrine their full credit, and do not oppose to them the experiments of Dr. Thompson, because I am willing to say that Dr. Hastings's explanation of them renders them doubtful.

Such are the phenomena, and the doctrine which rests thereon; with regard to the former I have only to observe, that there is reason to believe that Dr. Hastings *may* have been deceived in the appearance of the blood remaining stagnant for days, since it retained its arterial colour; or, if not deceived, that this affords a proof of the wide difference between the processes which take place in the lower orders of animals, and the human being, in whom this phenomenon does not occur, as all experience shews; for, if by pressure on the returning vessels of a part inflamed, or not inflamed, the blood be rendered stagnant, it very speedily assumes the venous appearance.

I must also observe, that on the supposition that the blood does move more slowly, it by no means follows that this may not be compensated by increased quantity, so that actually more blood flows through the part. I do not contend for there being increased velocity of the motion of this blood; I do not contend for there being increased contraction of vessels, but on the contrary it is granted that their *dilatation* is a necessary part of the process; but I do contend that *this dilatation is not essentially connected with debility:* it might as well be argued that the uterus dilates from debility to contain the fœtus, or the rectum to allow passage to the fœces. No doubt, in both these cases the cavities permit themselves to be distended; but having, by a temporary suspension of their action, or from the impression of a predominant force, suffered an alteration of their calibre, they immediately resume their usual degree of action on their contents, or probably act on them with more power than before. This may be equally the case with vessels enlarged from inflammation, or in another less exceptionable instance, *i. e.*, when the branches of a tied trunk enlarge*.

It by no means follows that the dilatation of vessels which was observed, depends upon debility.

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* Mr. Hunter was of opinion that this dilatation was in itself an action, and called it the action of dilatation.—Vol. ii. p. 10. I as much doubt the truth of the opinion that this enlargement of their calibre is owing to an action on the one hand, as to relaxation on the other; it is sufficient to explain the phenomena to suppose that canals or hollow organs, endued with

This doctrine will not account for the opposite states of acute and passive inflammation.

So obviously incapable is the doctrine of debility of explaining the opposite states of inflammation, *i. e.*, common or acute, and passive or weak, that its supporters have recourse to the *supposition* of the larger arteries possessing in the former an increased degree of action, but not in the latter; but that the capillaries are in a state of debility in both. Now, of course, if the propelling powers of the arteries are not proved, this must be doubted; and if disproved, fall to the ground.

Facts which support the opinion of increased action in inflamed parts.

Having premised then those *arguments* which oppose the doctrine of debility, I shall next proceed to state the *facts* (most of them enforced by other authors) which tend powerfully, as it appears to me, to support the contrary opinion.

1*st*. The phenomena of inflammation generally are similar to those which occur in processes, in which there is every reason to believe that the actions of the part are increased;—thus, in the growth or developement of any new part, as of stags' horns, in pregnancy, in infancy, the vascularity is more evident, and the heat developed in larger quantities. Richerand compares an inflamed part to a new organ, in which there is an excess of life, cxliv [*]; and indeed the process is very similar

Similarity of the phenomena with those which we know depend upon increased action.

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contractile powers, can accommodate their capacity within certain limits to the quantity of solid or fluid matters they are wanted to contain.

[*] Physiology, trans. by De Lys.

As the transparent parts of the embryo chick become vascular, so do parts under the influence of inflammation, and for the same purpose; to form new. Red globules seem to be required for the formation, the growth, the sufficient action of most parts; and why not for their reparation? We find them in the cartilage of ossification, when bone is about to be formed, and the vascular appearance which the bone then presents, is precisely similar to inflammation; the process performed is actually the same as that which occurs when the bone *does* inflame in fracture;—does the natural process depend upon debility?—*is* there reason to suppose that the repairing process does so?

Increased action of the heart, increased fulness of vessels, and increased disposition to bleed.

The actions of the heart are generally increased in inflammation, and the arterial system is commonly more completely filled by its pulsations; the veins returning from an inflamed part are also fuller; if blood be let from either, it will flow with more force;—does this look like a diminished or tardy circulation in it? Whoever has felt the throbbings of a paronychia will have a difficulty in believing that there is not an increase of the force of the circulation; but then it is maintained, that this is in the arteries only, and that the feeble capillaries cease to urge it on. Divide the inflamed part, and it will immediately be seen, that the blood pours forth from the whole surface, and in great quantity—more than could have been previously contained in it; but this may be ascribed to the vessels being weak and unable by their contraction to resist the flow. But observe what occurs; after a short time the open mouths of even considerable arteries cease to bleed a drop, and at the *same time* the capillaries also contract, and there is no more hæmorrhage: but irritate, stimulate the wound, apply pressure to close the vessels and prevent their bleeding, and there will be no end to the attempts of nature to overcome it, or act in opposition to them.

Some inflammations present phenomena the reverse of the others, and imputable to want of power, which gives an argumentum ex absurdo in favour of the doctrine of increased action in them.

In the majority of inflammations, the heat is increased and the colour is more arterial, but there are some in which the reverse is the case from the beginning. Now I contend that they are not both dependent upon the same state of vessels; if in one they are weak, in the other they must be strong; but as we find in a natural state of parts, that the colour is venous and the temperature low when the circulation is tardy, and the reverse when it is vigorous; it is a fair inference that in inflammation the case is the same. This objection to the doctrine of debility has been met again, by referring the difference in the two instances to a difference in the state of the *arteries;* but first, this takes for granted powers which are not proved to belong to them, and secondly, it will not explain the phenomena; for be the arteries in what state they may, it is contended by its supporters, that the circulation in the part is languid, which the above phenomena contradict in the one state *or* the other.

The results produced by the application of remedies may very strictly be considered as a *series of experiments*, provided we know what the qualities of those substances are. Now, if we find on the application of a known stimulus that we increase ordinary inflammation, it is a probable conclusion that the actions in it are already too great, and *vice versâ*. But this may be carried further, for we find that the same application which would increase the inflammation in the beginning, will lessen it after a time; if so, we cannot believe that the part is in the same state at both these times; and if so, the vessels are, we will say, strong at one and weak at another, it matters not which; but it is sufficient for the argument that they are not always weak.

The effects of remedies also.

If an inflamed part be pressed upon by the finger, so that the blood shall be forced from the vessels, on that pressure being removed, it will return with great velocity; whereas, if a part be reddened from cold, the contrary will be the case. In the latter we may suppose the circulation to be languid, in the former the reverse.

The increase of secretions, which generally takes place at some period in inflammation, is another indirect proof.

The enlargement of vessels in the neighbourhood, when those going directly to an inflamed part are divided.

The hypothesis of debility of vessels totally fails to explain one very remarkable phenomenon, namely, that if we divide the enlarged vessels going to an inflamed part, the cause of irritation still continuing, others immediately enlarge; and these even remote from the point where the division is made, as we observe with most facility in ulcer of the cornea: besides, we find the old ones uniting again, or new developed with a rapidity quite inconsistent with this doctrine.

Mr. Hunter's opinion.

Mr. Hunter, when speaking of Boerhaave's Theory, has made an observation which will apply, more or less, to all; namely, that if there were but one final cause of inflammation there would be but one kind*.

We may be content with believing that in common inflammation there is an increase of action, without connecting that with the muscular action of vessels.

Without thinking it necessary to inquire further into the final cause of inflammation, I should be much disposed to believe that there is an increased action of some kind in the part in all cases of acute inflammation, even when its powers are weak; and in supposing this there is no absurdity, for convulsion is undeniably an instance of an increased action, existing as well when there is much debility as when there is much strength; and that there *is* increased action we may judge from the results which we see in new growths, in increased secretions, *&c.*; also that it exists in the minute nutrient and secreting vessels, affecting different modes under various circumstances, which are the nature of the cause, the part, and the constitution; and it is not necessary to define in what it consists*. We know that under the influence of a hot sun, a vegetable will grow with rapidity, and we shall not use an objectionable phrase when we say that there is an *increased action* in it: yet it is not necessary to connect this with the muscular action of vessels on their contents†. We also

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* Vol. i., p. 459.

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* The following observation of Dr. Hennen's, if correct (which I fully believe it to be), is important with reference to this point. "It is worth while to recollect," he says, "that the hair grows much faster on an inflamed, than on a sound, piece of skin." Note, p. 265.

† Among modern writers of authority, the following may be considered as the chief of those who support the doctrine of increased action.—First and foremost, we have Mr. Hunter, vol. i. p. 13; vol. ii. pp. 3, 20, 68, *&c.*; Dr. Cullen, vol. i. p. 162, *et seq.*; by M. Boyer, vol. i. p. 13, *et passim*; by Mr. Burn, vol. i. p. 247, 292, *et passim*; by M. Richerand, vol. i. p. cxliv. In Dr. Thompson's valuable work, the opinions of Stahl and De Gorter are also cited as favourable to the same opinion: with regard to his own, it can hardly be precisely collected. He states the arguments, but, perhaps wisely, avoids coming to any definite conclusion.

On the other side, the chief advocates appear to be Vacca, Mr. Allen, Dr. Hastings, and Dr. Wilson Philip, whose eminent talents for research are entitled to the highest consideration.—I may also add the learned editor of the *London Medical Dictionary*, the late Dr. Parr, an eminent physician in this know that when an increase of natural secretion is to take place, as from the salivary or mammary

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city. A very distinguished lecturer in the metropolis (if I remember rightly) also holds a somewhat similar opinion: he considers that the small vessels of the part dilate and remain quiescent, and that increased action exists in the surrounding parts.

M. Bichat's opinions, as they are in a great degree peculiar, deserve separate mention. According to him, when any cause of irritation is applied to a part, it increases its organic sensibility.—In consequence of this, blood (he means red blood) is called for by the capillaries, which before were only traversed by the transparent juices, and it remains accumulated there until the type of the organic sensibility again becomes natural (vol. ii. p. 496); and the nerves have nothing to do with all this (vol. ii. p. 563). It is immaterial whether the irritation is directly presented, or intermediately communicated from some contiguous organ, or by sympathy. The inflammation itself consists in an exaltation of the organic sensibility and insensible contractility (vol. i. p. xlvii). from the former, the sensibility becomes animal, and pain is felt (vol. ii. p. 498), differing according to the peculiar sensibility of the tissue in which it occurs. The fever arises from the connexion of the heart with all parts (vol. ii. p. 499), and the differences of the fever depend upon the differences in the vital properties of the tissue affected (vol. i. p. xc). He refers the differences in inflammation to the tissue in which it occurs, " C'est bien toujours le même individu, mais en entrant dans chaque système, il y prend un masque différent, *au point souvent que vous ne la reconnoitriez pas.*" Vol. ii. p. 506.

The symptoms depend upon the nature of the tissue, which is nearly the same wherever situated, and upon the functions glands, the vessels leading to the part dilate: probably it would be wrong to apply either the term increased action or relaxation to *them*. It may be accounted for by the influence of sympathy felt between the parts where the actions are performed, and the vascular centre. Upon the same principle of sympathy many of the phenomena of inflammation may also be explained.

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which are disturbed in the organ with which that tissue is connected. Vol. i. p. xciii.

Some tissues are the same throughout, as the bony, and muscular, and fibrous, of animal life; others are modified according to the organs they belong to, as, the cutaneous, serous, mucous, *&c.*, which must produce a modification in the phenomena when diseased. This is still more the case with the glandular system and the muscular of organic life. Vol. i. p. xciv.

When the alteration of the organic sensibility only differs in intensity, then the inflammation only differs in degree (vol. ii. p. 498). Thus, it should seem that he considers inflammatory affections of the skin from mere blushing caused by external irritation, through the different kinds of cutaneous inflammation up to erysipelas which terminates in gangrene, as only inflammation of the same tissue, of different degrees of intensity, 'of which one might make a scale' (p. 499). When it differs in nature it may be combined with an adynamic character, or other modifications, all which depend upon an alteration of the organic sensibility (p. 500); and he proceeds to notice the disposition to putrefaction or gangrene,—to suppuration,—to induration or resolution, as instances of alterations of the organic sensibility leading to different modes of termination (p. 502).

CHAP. III.

SECTION I.—*On Sympathy.*

What is meant by sympathy.

THE body consists of an assemblage of organs, the functions of each of which are essential or contributory to the healthy and vigorous action of the whole, but in different degrees. They are so connected that the system at large can both feel the influence of any impression made on a part, or any process going on in it, and can communicate to it an influence arising from its own state. Between several parts also, whose functions are especially connected, a particular communication of feeling and action exists. This connexion of all the parts with each other, and of several between themselves, is most probably effected by means of the nerves, at least there is every reason to believe so, and it is denominated sympathy. Were we acquainted with all its laws, we probably should have little left to learn in pathology.

The different modes in which it may be said to appear.

We have only to consider it as connected with disease, and in this point of view alone Mr. Hunter treated of it. He has spoken of universal and partial sympathy; of the continuous, contiguous, and remote; of similar and dissimilar. Perhaps it would be more simple and satisfactory to consider it under three heads:—1st, *Sympathy of immediate connexion*, which will include the continuous and contiguous. 2nd, *General Sympathy*, of the whole with parts, and of parts with the whole. 3rd, *Sympathy of Function**.

The most simple instance which presents itself of the connexion of inflammation with sympathy is to be found in cases of injury.

Influence of sympathy in producing the processes of inflammation.

When a part is injured from any cause, there is an attempt made to repair it by the effusion of organizable lymph, and the conversion of this into animal structure. To effect this, an increased flow of blood into the part, seems to be required, which is accompanied with an increase of its sensibility and temperature, and it may be conjectured that an extraordinary degree of vital energy is manifested in that part. It is from the influence of sympathy that the vessels leading to it consent to enlarge, to transmit the requisite quantity of blood; that the heart itself, if the injury is considerable or important, increases its efforts to send it, and that in some other parts of the body the vessels and the nerves act with diminished powers, in order that a greater supply of nutritive fluid, and the chief exertion of vital energy may be concentrated on that where the new process is going on. The phenomena which occur locally are termed inflammation; those which take place generally constitute sympathetic fever.

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* Mr. Burn, who has devoted considerable attention to the subject of sympathy, and with reason perceived that the phenomena of inflammation and fever greatly depend upon it, has divided it into two kinds:—1st, Sympathy of Association; and 2nd, Sympathy of Equilibrium. I should be rather inclined to consider association as the *principle* of sympathy; and a tendency to maintain an equilibrium in the actions of the living body,—a *disposition* or *mode* of its exertion often manifest.

It is the opinion of Mr. Burn, and of some other physiologists, that each part of the body has its proportion of vital power or principle, call it by what name we please; and he is also of opinion (in which he coincides with Darwin and others) that the action of one part cannot be increased unless it is at the expense of its diminution in another, which arises out of the principle just alluded to. Although this is doubtless true in many instances, yet it might be dangerous to admit it as an universal principle.

The consequences of the actions excited by sympathy exceeding due bounds.

When the sympathetic actions of the part, and of the constitution, do not exceed a due degree, they are not only not injurious, but useful and necessary: but, supposing they do exceed that degree which is so, what will be the consequence?—That much more blood will be brought to the part than it can dispose of, and with an undue degree of force, both which circumstances disturb the action of the minute vessels, and they cannot perform their task. But the efforts of the constitution are in proportion to the necessity for repairing the mischief and the difficulty in doing so; the struggle, therefore, on the part of the system, increases, as the mischief itself increases, from the very efforts made to remedy it, and disorganization, as it is termed, ensues, *i. e.*, the vessels are so overstrained by the influx of blood, so disabled by over-exertion, compressed by surrounding effusion, or, perhaps, actually ruptured, that they are disqualified for their proper offices while fresh efforts are still made to obtain the object. Although, however, this cannot be directly accomplished, the vessels, are, nevertheless, gifted with the power of effecting this indirectly in a great number of instances, by the formation of granulations to which the secretion of pus is accessory; if, however, the repair has been obstructed by such over-action as now stated, that pus will be of an unhealthy nature; and if this end cannot be attained, the last resource of nature to terminate the struggle between the part and constitution, is, to remove it either by ulceration or mortification.

The degree and kind of actions sympathetically excited, are much influenced by the nature of the injury, state of the constitution, and nature and state of the part.

Certain circumstances affect the kind and degree of the sympathetic action, whether it be in the part or in the general system: upon these the phenomena which attend inflammation and which constitute its differences, in a great measure depend, and they require the most sedulous attention. All that remains to be said, previously to entering on the subject of distinct forms of inflammation will have reference to this point; suffice it to say, that the degree and kind will vary according to the nature of the part, the cause, and the constitution*.

Consequences which arise from continuity of surface.

With regard to the *part*, the difference in its nature has a most important influence, as has been already recognised, p. 20: with reference to sympathy, however, we need only now consider its continuity or contiguity.

Surfaces, being continuous, are found for the most part to partake of the same nature throughout; and any impression, and consequently inflammation, communicated to any one point will have a disposition to diffuse itself. This disposition, however, is modified by the following circumstances:—*First*, the degree to which it has been liable to impressions: thus the internal membranes have a much greater tendency to inflame throughout than the external, as the conjunctiva, or those which may be considered external, as the urethra; and if the internal have been accustomed to præternatural impressions, they lose their extreme disposition to inflame, as is proved by the result of paracentesis when the serous membrane of the abdomen has long been exposed to the pressure of a large bulk of fluid.—*Secondly:* different parts of the same surface, in some instances, possess different vital properties; thus different portions of the alimentary canal perform different functions, form different secretions, evolve different gases, are inhabited by different worms, and infested by different diseases; and this operates as a powerful cause in checking the extension of sympathetic action.—*Thirdly.* The disposition to spread is gradually lost on surfaces, becoming evanescent, like the spreading ripple on a pool.—*Fourthly,* and *lastly.* It may be arrested by the effusion of organizable lymph, and the formation of adhesions.

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* *Mr. Hunter*, vol. i. p. 449—ii. 87-207.

Organs are continuous in their texture, and inflammation will more readily extend itself through the structure it commenced in, than invade another which is defended, to use an expression of Bordeu and Bichat, by an atmosphere of cellular membrane*. Nevertheless, its progress in solid organs seems to be slower than on surfaces; it has been supposed, (perhaps without reason), that inflammations of the latter partake more of the nature of erysipelas—of the former of phlegmon.

Some inflammations are confined to the surface, or the organ they attack; while others extend to the contiguous parts†; this disposition seems to depend upon the constitution, or the cause, and not upon the nature of the part. There is a disposition, as above stated, in contiguous parts to resist the extension of inflammation in many instances; in others, however, the case is remarkably the reverse;—as for instance, when the cheek swells from an inflamed tooth, or the scrotum in strangulated hernia, more especially when, as I have seen, a spot of mortification has formed in it, just opposite that in the intestine—although the inflammatory action in it had never been considerable. The general resistance, however, of disease by neighbouring parts is so strong, as to afford reason, in conjunction with other phenomena, for doubting how far the vital powers and properties of different organs and tissues are owing to nerves; for it will be observed, that those parts which so strongly resist the progress of inflammation are supplied in many instances with both nerves and blood-vessels, not only from the same trunks, but from the same branches, and even from the same twigs. It seems probable that the vital power of particular parts is resident in them*, and that the nerves are merely

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* Bichat distinguishes between the loose cellular membrane generally pervading the body, and that dense filamentous kind which is exterior to mucous membranes, blood-vessels, and which opposes a strong barrier to the extension of disease.—Vol. i. p. 87.

† On this it depends that catarrh in many cases becomes bronchitis, diarrhœa, enteritis, &c.

From contiguity of situation.

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* Bordeu maintained the doctrine that each organ was possessed of a distinct vitality. Bichat denies this, and ascribes it to the several tissues: perhaps they *may* be both right in part, but when we see some organs, as the testes, developed, passing through their period of activity and again becoming torpid, in-

organs of communication; chordæ internunciæ as Mr. Hunter has called them, in the truest sense of the word.

It is unnecessary for me to dwell either upon the nature of *sympathy of function, or remote sympathy;* but before dismissing the subject of sympathy, it *is* necessary to state my belief that the phenomena of disease chiefly depend upon the following fact:—That there are some organs which cannot be affected in any way, without all the rest participating in a great degree, and it is intended that they should, under all circumstances, regulate the state of the system; these are, the stomach, alimentary system generally, the brain, and the heart; and in proportion as they are capable of influencing others, are they liable to be impressed in their turn. Others again, both impart and receive a less degree of influence; but the rule seems to be, that this is determined by the extent to which their functions contribute to the support of the whole, and it is this which may be denominated *general sympathy.*

Systems which by the extent and importance of their sympathies are affected by every injury, and influence every function and process.

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dependently of the body generally; while others, as the tongue, fully preserves its activity amid the general decay of all other parts, I cannot but believe Bordeu is correct in his views.

SECTION II. *On the Accordance of the general and local Affection.*

THAT the constitution sympathizes with any local disease, and certainly with inflammation, and that every local disease is more or less influenced by the state of the constitution, are points now perfectly established; but with reference to our present purpose, it is of consequence to ascertain to what extent this principle applies.

The affection of the system generally accords with that of the part in kind, and probably in degree.

It appears probable, from considering the phenomena which present themselves, that the affection of the system accords with that of the inflamed part in *kind,* if not in *degree;* it is a natural supposition that it should do so, but the principle has not, as far as I know, been distinctly recognised, excepting by two authors*. Mr. Hunter's words seem to imply a contrary opinion: " Fever is a good symptom *when* equal to the injury, and of the *same kind* with the local affection, when that kind is good*." It is a matter of some consequence to settle the principle, with reference to the proper understanding of the nature of sympathetic fever.

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* Bichat, after saying that low inflammations terminating in gangrene are, to adynamic fever, what phlegmon is to inflammatory fever, and irritation of the primæ viæ to the meningo-gastric; adds, " I believe if we were to examine attentively local affections and general fevers, we should always find a species of fever corresponding in its nature to a species of local affection."—Vol. ii. p. 502. See also W. Philip on *Febrile Diseases.*—Vol. iii. p. 108.

In the first place, there are many circumstances particularly observable in those cases which arise from injury, which tend to support the opinion. Thus, a clean cut, a lacerated wound, a contusion, a sprain, a limb suddenly removed, the bite of a venimous animal, shall all produce a peculiar effect at the time they happen, and the actions which ensue differ in each, general as well as local.

2dly. We are often called upon in practice to put this matter to the test of experiment, as thus: we find that we aggravate or lessen the *degree* of the general affection in proportion as we increase or diminish the local inflammation; but, what is more to the purpose, we change the *kind*, by laying open foul abscesses, exposing sinuses, amputating mortified limbs, or compound fractures, by which we do not put an end to local disease, sometimes do not lessen its extent; but we change its nature, *and the constitutional affection as invariably alters.*

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* Vol. i. p. 460., Dr. Thompson also says, "No sooner therefore does any of the subordinate parts of the animal economy receive an injury, or become affected with disease, than changes are induced in the general system, corresponding in *some* degree to the *nature*, seat, and extent of the local affection."—P. 90.

3dly. If the secretions cease in a part from its being inflamed, those of the whole system are arrested or checked. When they recommence in the part, they are restored throughout the body, whether it be pus now formed or the natural secretions; if by treatment, the period when the secretions take place from the part, should be protracted, as sometimes happens, the return of the general secretions is also delayed; while, if we can accelerate the one, we hasten the other likewise; if the local secretions are profuse and unhealthy, so generally are those of the system, and in this way perhaps the colliquative sweats, and diarrhœa which occur under profuse discharges may be explained.

If mortification occur from accident in an individual previously healthy, in a few hours he shall be reduced to the same state as another in whom this affection originated from long error in health.

A man shall have compound fracture, and in the advanced stages of that calamity bleeding would sink him; let a vital organ inflame from cold, or any other cause, and the same depletion which a few hours before would have destroyed him, now will save his life. It is unnecessary to multiply examples. My conclusion is, that there is such an accordance between the actions going on in the part and in the system, as if they extended over the whole body; and any means which relieve the part will relieve the whole, or those which will relieve the whole will relieve the part. Nor do I think Dr. Kirkland's idea amiss as explanatory of the fact, namely, that the nerves every where present an expansion of the sensorium.

The idea of fever is often, but not very correctly, connected with that of vascular action, and the degree of the one measured by that of the other; where there is force of vascular action in the part, there will be found, I believe, a proportionate degree in the arteries generally; but it must be understood that this is not essential in all inflammations.

Fever, like inflammation, is a simple expression signifying the existence of certain phenomena; but the varieties in fever depend upon other affections being grafted upon it, or upon those phenomena which it usually presents, being variously modified. There is no one symptom, taken separately, which presumes its existence, and therefore no conclusion when it does exist can be drawn from the nature, nor can we measure its degree or appreciate its kind from any one symptom.

And there are varieties of fever according with the differences in various inflammations.

If the position above advanced be true, namely, that the constitutional affection varies in nature according to the local inflammation, then, as there are many and very different kinds of inflammation, there will be numerous modifications of the systematic affection called fever. Some eminent pathologists lean to the opinion, that the fever which accompanies inflammation approaches nearly, or even entirely, to the characters of the idiopathic species*. This, to a certain degree, is true, because all fevers, let their cause be what it may, are liable to be affected by the excess or deficiency of nervous power; by the state of the bilious, gastric, and intestinal systems; by the degree of irritability, *&c.;* but in many essential particulars they differ†. In the sympathetic, the duration is uncertain; the crisis (depending upon the local disease) different; the sensorium either less affected, or differently affected in general; the secretions rather arrested than much disordered in many instances, and *different modes of treatment induce different results;* thus the use of antimony in nauseating doses—often of opium—of large phlebotomy, *&c.*, mark a difference in the general character; but this question is further considered in another part of this work.

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* Particularly Pinel and Dr. Thompson.

† Fevers vary according to the greater or less degree of affection of the alimentary, nervous, and vascular systems, and according to the mode of disturbance.

In idiopathic fevers, which mostly arise from some specific contagion or miasmata, or from some sudden alternation of temperature, the types are not numerous, if we exclude those attended with external inflammation, *e. g.* an eruption.

In sympathetic fevers, which consist in the sympathy of the constitution with the local inflammation, the type will differ more or less with each inflammation—each will have its modification.

The local affection will in like manner vary as the particular state of the constitution.

As the constitutional affection is influenced by local disease or injury, so is the latter by the former; and we may suppose *simili modo;* but here we have access to fewer facts. One of the most unexceptionable proofs, however, is to be found in the history of amputation; for if that be performed after injury, previous to the accession of fever, it generally does well; whereas, if afterwards, the state of the constitution becomes the cause of the stump inflaming and often doing otherwise.

CHAP. IV.

OBSERVATIONS ON SOME OF THE CAUSES AFFECTING THE SYSTEM GENERALLY, WHICH INFLUENCE THE PROGRESS OF INFLAMMATION.

SECTION I.—*On the State of the Digestive Organs.*

A disordered state always highly injurious.

WHEN there is error in the constitution, that will materially impede the curative processes in disease, and in inflammation commonly gives rise to actions excessive in degree and imperfect or faulty in kind. This error must depend upon disorder in one or more of the three principal systems of organic life:—the alimentary, vascular, or nervous.

No part of the alimentary system can be disordered without the rest participating more or less; but it is well known that one part of the canal is apt to take the lead, or that disordered action of the liver is predominant. It would be quite superfluous and presumptuous in me to enter into any details on this subject; it is my intention only to express, in a very general way, what I apprehend to be the leading principles with reference to inflammation.

Mr. Hunter's opinions respecting the stomach, not fully confirmed.

Mr. Hunter attributed a great share of influence to the stomach: he thought it the chief seat of vital energy, and of the production of animal heat. *All* the claims of importance which he awarded to it, cannot be conceded; but it must, nevertheless, be allowed, that it is the principal centre from which good and evil proceed to our systems. Subsequent physiological researches have proved that his opinion, respecting its power of developing animal heat, was erroneous; yet its influence upon this process is remarkable. When the stomach is feeble, torpid, or oppressed, there is general want of power and universal coldness; the extremities may even be below the temperature of the surrounding medium, if I mistake not. While a cordial given during this state, shall, in a moment, like an electric shock (to which Dr. Heberden has well compared its effects), kindle heat and communicate vigour through the whole frame. Such an organ cannot be disordered without imparting an important and injurious influence to every part of the body and every process going on in it. If there is inflammation, it continues to spread, The blood is propelled with increasing force and increasing quantity to the part; but no efforts of the heart and arteries can communicate that *disposition*

But its influence most important.

The processes of inflammation are to be

performed by the minute vessels, and their state depends greatly upon the stomach and bowels. The efforts of the heart do nothing towards repair but simply the sending blood.

to the minute vessels which will enable them to perform the necessary curative processes: they can only obey the demand to send more blood, which, as it cannot be rightly and usefully employed, increases the mischief. But if by appropriate means or medicines, we can relieve this disordered state of the stomach, the disposition to healthy action in the minute vessels is imparted,—the call for blood subsides,—the action of the vascular system abates; in other words, the inflammation recedes and the fever ceases.

There is no case of disorder in which the stomach is not affected; but these observations are, of course, intended to apply where that affection exerts a particular influence. Similar remarks will apply to the other parts of the digestive system; and the profession and the world are under the greatest obligations to Mr. Abernethy, for disclosing to them, in the most convincing and impressive manner, the truth, which so long lay concealed (or rather, I should say, unheeded), that health and strength spring from a right performance of the chylo-poietic functions; and that weakness and disease depend upon their disorder and derangement. To his works I may refer with confidence for that accurate and important information respecting this subject, which will be the best guide to a surgeon in the practical part of his duty.

Causes of inflammation, either external, as injury or excessive temperature: or internal.

Inflammations arise either from direct injury; from the effects of excessive changes in temperature, or from causes which may be strictly considered as internal; such are a disordered state of the chylo-poietic organs, as above stated; an impure state of the blood itself, the result of such disorder; disease of the vessels themselves, which generally springs from the same cause, or the introduction of foreign matters into the system.

Internal, which often cause, and always influence, inflammation, are,

1st, Impure state of the blood.

An impure state of the blood exists, perhaps, more frequently than we are aware of; but, as it is invariably connected with disorder of the digestive organs, the effects which partly arise from both causes, are often exclusively attributed to one. But when I see persons in whom every scratch festers into a sore, as in scurvy or scrofula;—when I observe that the atmosphere alone will change the disposition of every action;—that poisons introduced, and acting upon the circulating medium, will induce the most powerful effects upon the whole system;—I must profess myself to be a humoralist in a considerable degree, (although quite ready to recognise the direct, as well as the indirect, influence of the digestive organs and nervous system on disease,) a doctrine which Mr. Abernethy has himself most perspicuously enforced, with reference to many; for, although he prefers the general explanation of the phenomena of disease by sympathy, yet he does by no means exclude the influence of a depraved state of the blood*.

Observations on the humoral pathology

If experimental research often instructs, I believe also it frequently deceives us, because we too hastily form deductions from what *we* deem *conclusive* experiments. Now, the opposition to the humoral pathology has chiefly been grounded on the fact, that we cannot discover such an alteration in the circulating fluids as would seem to us to justify the supposition that it exists. When, however, we see the efforts and the expedition with which the animal economy rids itself of *some* foreign matters, which we can recognise by their specific effects, as ipecacuanha or jalap introduced into the veins, or by their sensible qualities, as mercury, nitre, asparagus, turpentine, garlic, *&c.*, introduced any how, we must be strongly prejudiced, not to believe that those matters have been contained in the blood—even although in the blood we cannot perceive them. But do not the vital powers quell and suspend the chemical properties of most substances?—Do they not convert the most dissimilar matters into an apparently similar substance?—May they not prevent these, and others, from manifesting their specific qualities, which, nevertheless, though modified, are not completely subdued, and may still excite great disturbance in the constitution?—And if so, may not these powers, with reason, be supposed to prevent the *sensible* alterations in the qualities of the blood, in such diseases as scurvy, scrofula, gout, lues, mercurial disease?—And if we are compelled to admit such alterations in these, may we not be called upon to allow that it possibly exists in a greater or less degree in many others? The abuse of the humoral pathology has led to infinite mischief; but if we are content to recognise the truth of the doctrine, as far as facts seem to establish it, without, however, grounding any theory or practice on that which we only imperfectly understand, no harm can arise from our belief. We can never err while we consider experience paramount.

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* Vol. i. p. 56, Edit. 1811.

2nd, Quantity of blood.

The Quantity of the blood exerts a very material influence on the progress of inflammation, as well as the quality; and, as it happens that most of us are over-fed, and over-full, it must follow that the plethora, which so commonly exists, will materially aggravate any inflammation that may occur: upon this principle is founded the general practice of bleeding to *prevent* the ill effects of injury. The simple and natural treatment of veterinary surgeons, is also chiefly founded upon this fact. Bleeding will prevent or cure most of the diseases which over-fed, and unnaturally-fed, animals, are liable to, in acute cases; and pure air and the food which the fields afford, will cure most of the other diseases which infest them in the stable.

3rd, Diseased state of vessels.

A DISEASED STATE OF THE VESSELS, when it amounts to ossification, has been considered the cause of that inflammation which in old people so strongly tends to mortification in the extremities. It often exists in the male sex, where habits of excess of any kind have prematurely brought on this state, and its effects are, and must be, to obstruct the efforts of nature in every case where inflammation shall have been produced from *any* cause.

External causes which act internally

4th, Air and temperature.

THE INFLUENCE OF AIR AND TEMPERATURE, seem to be immediately connected with the state of the circulating fluid, on which their agency is primarily and principally exerted. Their influence is recognised, but not, perhaps, generally attended to, in the full extent it requires. We know that the same disease goes on very differently if the patient be situated at the top of a hill, or in a low valley;—on an open heath, or in a jungle or marsh overspread with pasture and foliage;—in the open country, or in a populous town;—in a spacious, clean, and well-ventilated apartment, or in a small, close, and dirty room:—nay, in the upper story, or ground-floor of the same building; or even, if well elevated above the floor, or placed upon it. I believe there is no poison more injurious than foul, no restorative more effectual than pure, air, and it runs no risk of disordering the digestive organs, as bark often does, or stimulating the vessels too much, like wine. It is always safe and always useful. There is no surgeon but is aware of its influence, but many do not sufficiently advert to it*, perhaps because it is such a common thing; but it is even more indispensable than food, and upon its purity the proper changes of the blood must depend; *and although the system can bear the influence of improper air, as well as improper food, with impunity, when in a state of health and vigour, this is far from being the case when labouring under disease;* and it often happens that air exerts more influence than food,—for the strictest attention to diet often fails, when a change of air restores the patient.

Important influence of air.

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* To the military service this remark will by no means apply. The influence of air and climate is, in many instances, paramount to all other considerations, and there is sufficient evidence of its importance accumulated in the works of many medical writers in that service, both of this and foreign countries.

No modern writer on surgery has insisted so much on the influence of air as Dr. Hennen.—*Observations on Military Surgery*, p. 202, *et seq.*, 253, *et seq.*

Exerted immediately upon the blood.

If it be demanded, upon what system the air chiefly acts? I should again say, on the blood; for, if we take a man in previous good health, and place him in an hospital, for an injury not very severe, at a time when the cases there are doing badly, and find, that, without any cause which can particularly affect his alimentary or nervous system, a bad kind of inflammation is set up, is it an unreasonable conjecture that the blood which, in the lungs, is particularly exposed to the contact of this air, should be thereby rendered impure? If we find that he does much worse when lying on the floor of the ward than if raised two or three feet above it, knowing that it is more deteriorated at the bottom than any where else, will not this opinion receive strength? And if, on sending him into a pure air, he does well, will not this add confirmation? It must be understood, however, that, although blood rendered impure by this, or any, cause, is likely to afford but a bad material for the processes going on in an inflamed part, yet that its operation on the nervous system, generally, and through this on the alimentary, is, perhaps, equally, if not more, injurious.

Effects of temperature chiefly indirect, producing a material altera-

TEMPERATURE.—With regard to *temperature*, the history of the diseases of different climates very clearly shews that it exerts a most important tion in the qualities of the atmosphere.

influence*; yet it may be much doubted, whether this is owing to the *direct* agency of heat. It should rather seem to proceed from the changes it induces on the atmosphere, by its action on vegetable and animal matter. Many mechanics, as anchor-smiths, glass-blowers, *&c.*, almost live in a temperature far higher than the tropics; but, although they are but too apt to indulge in every species of excess, yet their diseases in no degree resemble those to which the inhabitants of tropical climates are prone. Under the same temperature, different districts are far more unhealthy than others, and their diseases are marked by peculiar characters. The diseases of spring and autumn, when the temperature is the same, are very different. This has been accounted for by supposing that the heat of summer has occasioned a certain alteration in the system, and, to a certain degree, this is the case, no doubt: but are persons coming to this country, in the spring or summer, from warm climates, subject to autumnal diseases? I believe not; and they should be if this were the only cause. Cold certainly occasions a strong disposition to inflammatory diseases.

5th, State of the nervous system.

THE STATE OF THE NERVOUS SYSTEM is, in a great degree, regulated by that of the digestive organs, either directly or indirectly by means of the blood, which will also produce its effects if acted upon by the atmosphere. But there are causes which are more immediately connected with the nervous system itself; such are dispositions inherited from parents or derived from age, sex, habits of body, or habits of mind; we cannot enter into any details on the operation or influence of these causes; we must content ourselves with saying, that to whatever cause the state of the nervous system may be owing, with reference to inflammation, we may consider it either as too strong or too weak—too irritable or too indolent.

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* Mr. Hunter seems to attribute this in a great measure to the habits of life in different climates, vol. i. p. 399.

Dependent on the digestive organs directly or indirectly, or on the age, sex, habits, or innate constitution of the individual.

Question as to the good or ill effects of weakness or strength with reference to inflammation.

It would seem almost impossible that any individual should be too strong to bear disease; yet we have Mr. Hunter's opinion that strength brooks disease ill; and upon this principle is founded the practice, that it is better to wait in cases of injury requiring amputation before we perform an operation, until the patient has been accustomed to the actions of disease—a practice still sanctioned by many very eminent surgeons, but which is opposed by the result of the most extensive series of observations which has ever been offered to the world perhaps, since history has commemorated the events of which it has been the theatre;—I mean those which have been afforded by the late wars in Europe. It is probably not the state of health which is adverse to the due processes of restoration, but the plethora which so often accompanies it; and we do not sufficiently consider, that in performing operations, we usually exert ourselves to prevent almost entirely the reduction of the circulating fluids by hæmorrhage, which is one of the modes provided by nature to obviate the mischief arising from an undue quantity. We are bound not to hazard our patient's life, or full recovery; but, I believe, we often carry our interference much further than we should, in preventing it. We often see surgeons, in describing operations, commemorate with no small degree of complacency the fact, that scarcely any blood was lost during them; the circumstance is creditable to their skill in a greater degree than it is profitable to their patients.

Strength advantageous as an indication of sound constitution.

If strength is to be considered advantageous, inasmuch as it is the result of health; weakness is only to be feared when it arises from unsoundness of constitution. We need not be afraid of strength; because we have it in our power to reduce it. We need not seek to obviate weakness when it is merely the natural result of disease. If, for instance, we are to perform an operation rendered necessary by injury, although the patient may be rendered weak by the previous processes, we do not on that account think it desirable to give him tonics or cordials to prepare him for it. It seems to me to be of consequence to establish the point, that when weakness

Simple weakness not injurious: but is unfavourable when a result of unsound constitution, or however induced in an irritable or unsound constitution.

exists simply, without disorder, it will not lead to any mischievous consequences; and that strength, in as far as it is the offspring of sound health, is advantageous. But it may exist in persons whose constitutions are bad; and then, certainly, if we perform an operation, we shall not have had the advantage of correcting this error, if we proceed to it at once, which we might possibly accomplish if we deferred it*. It may be observed that the

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* Either Mr. Hunter's expressions on this subject are ambiguous, or they express opinions, which, with all our respect for his great authority, cannot be received without reserve:—

"An injury which produces a new mode of action, and a disease which is a new mode of action, often happen when the machine is in perfect health, and in such a state as is perfectly in harmony with that health, but which state is *not suitable to disease; therefore, it is to be presumed, the more perfect health the body enjoys, the less it bears a change in its actions. Thus we know that strong health does not bear considerable injuries, such as accidents, operations*, &c." Vol. ii. p. 88.

"Strength and weakness are the opposites of each other, and therefore must have very different effects in disease." Vol. i. p. 402.

"Strength, probably, under *every* circumstance produces good effects, or, at least, it is always more in the power of management by art than weakness; I can conceive, however, that *too much* strength might act with too much power, becoming unmanageable under disease that excites action." *Ibid.*

"Strength lessens irritability." *Ibid.*

P. 405, he proceeds to state more at large the *advantages* of strength and soundness of constitution; while in vol. i. p. 411, remarkable fatality which attends secondary amputations, proceeds less from the weakness, or strength simply, of the subject, than from the inflammatory diathesis which the processes consequent on the injury have produced in the constitution.

The nervous system may be naturally irritable, *i.e.*, morbidly disposed to sympathize, which is disadvantageous

Irritability of the nervous system is generally the result of disordered health, and becomes a cause of disorder in its turn; but in some persons, it is far more irritable than in others, even where the state of general health is the same. It is not my business to enter into a disquisition on the causes which produce this, generally; but its relation to disease is very important; for what is meant by irritability, in a medical sense, is, a preternatural

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he recurs to his former opinion:—" But it is to be observed, that constitutions in full vigour, or which have not been in the smallest degree accustomed to local disease, take the alarm much more readily than those which are not in such full health, or which have been accustomed with local disease."

Mr. Hunter himself seems aware that this opinion is not easily reconcileable with the last quotation, for he proceeds to say, " This would appear to be a contradiction to the above position; but, upon an accurate investigation, I think it may be accounted for: for, first, I do not look upon full health as the best condition to resist disease;—disease is a state of body which requires a medium; health brooks disease ill, and full health is often above par, *&c. &c. &c.*," (p. 411); which opinion is farther confirmed by the quotation above from vol. ii.

sensibility and disposition to sympathize, augmenting, of course, the effect of every morbid impression*.

Weakness often increases this irritability; thus, if a person of irritable constitution happens to be strong at the time he is exposed to an injury or morbid impression, he shall resist its influence with much success; whereas, if weak, it shall produce a great effect; but weakness is not to be considered as identick with irritability, nor strength an exemption from it; a constitution already irritable is, however, rendered more so, if weakness is superadded; and in such, strength counteracts it very advantageously †.

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* Hunter, vol. i. p. 465.

† Hunter, vol. i. pp. 406, 407, *et passim.*

CHAP. V.

ON THE PURPOSES AND USES OF THE DIFFERENT MODES OF INFLAMMATION.

Spontaneous inflammation probably answers a salutary purpose.

THE animal body is perpetually undergoing a process of wasting from its own actions, and the loss is repaired by organs which assimilate other matters, either actually possessing, or which have possessed, the principle of life, and are termed food; and by vessels which replace the original matter of our bodies by the new thus obtained, and in this way its growth and maintenance are provided for.

This more clearly the case when it arises from injury.

But it is liable to injury from without, or from within, by which parts are destroyed, removed, divided, or rendered imperfect in their powers or actions[*]; and the usual processes are not sufficient for the repair of the mischief; under these circumstances *they are gifted with the extraordinary one of inflaming*, which must so far be deemed salutary[†].

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[*] This proceeds from the stimulus of imperfection, according to Mr. Hunter.—Vol. i. p. 334.

[†] *Hunter*, vol. i. p. 438, *et passim*. Mr. Burn doubts the

It is the object of inflammation in external injuries to repair the mischief done, or to protect the body from the further operation of the cause.

The object, to reproduce parts which have been removed;

When parts are *removed*, there is a disposition to reproduce or restore them, which however can only be perfectly accomplished in the lower orders of animals; for in the higher, although certain tissues, such as bone, artery, tendon, skin, cellular membrane, *&c.*, can be so more or less; parts or organs of complicated structure never are*.

Or to unite those which have been divided.

When parts are *divided*, a *similar* disposition is produced as when they are removed; and new are

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salutary tendency of inflammation, and challenges Mr. Hunter's doctrine that events take place in the animal economy because they are useful, vol. i. p. 344; but this dissent is maintained on very light grounds, as appears to me.

* The cause of this difference between the two classes may perhaps be thus accounted for: A state of repose continued for a considerable time is probably necessary for parts of complicated organization to be formed anew. The lower orders of animals are capable of obtaining this from their nature and constitution, which enable them to dispense with the necessity of taking food for a considerable time, and consequently with the exertions required to procure it; whereas the reverse of this is the case in hot-blooded animals, and therefore perhaps Providence has not formed them with powers for performing a process they could never have brought to perfection; and although, with the aid of his fellow-creatures, man enjoys advantages in this respect, no other animal does, yet the general principles of his constitution being the same, he with them suffers under this disability.

formed to fill the chasm and connect the separated surfaces.

Process of adhesion—is it inflammation?

The reunion of parts simply divided, and then replaced in a state of considerable approximation, has been explained by Mr. Hunter in a two-fold manner. 1*st.* By the spontaneous organization of the effused blood. 2*dly.* By the effusion of lymph, suited for the purpose, into which organization extends.

On the former mode, which has been lately supported by the authority of Sir E. Home, it would not become me in the present stage of the investigation to offer any remarks; there are many strong arguments against it, but these must give way to facts, when they are fully established.

The process of immediate adhesion has by some eminent pathologists been distinguished from inflammation*; the point is not very material, but I should rather be disposed, with Mr. Wilson, to consider it as a slight degree.

Inflammation does not prevent it.

Inflammation has been said to prevent the adhesive process; this, I believe, is not true; adhesion will not take place when it exceeds certain limits, but we have innumerable proofs of its occurrence when the symptoms of inflammation are quite evident.

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* This was Mr. Hunter's opinion. Mr. Burn considered the process of union, when inflammation did not supervene, as analogous to that of simple nutrition; but it is clear that in every case there must be some new formation, however slight, unless we believe that two parts of a living body may be put together so nicely, as to form one whole again immediately, like two bits of putty, or the cock's neck in the hands of a conjuror.

Inflammation may arise from injury without any division of parts, and it must be concluded that its object is salutary.

Inflammation may arise from external injury, although *no division* has been produced: as for instance, from any mode of mechanical irritation, as pressure, or friction, and from chemical irritation of every kind. Under these circumstances it should seem, that its object is either to get rid of the noxious cause by an increase of the secretions, or to protect the neighbouring parts from its influence by adhesions; or, if these purposes cannot be effected, to remove the parts themselves by ulceration or mortification. It is also probable, that it is sometimes produced for neither of these purposes, but merely to restore parts to their healthy functions, at least we may suppose this to be the case in some contusions, if they ever occur without disorganization, and in scalds.

The disposition to adhesion or to suppuration will much depend upon the object to be accomplished and the structure of the part.

The disposition to the adhesive, or to the suppurative modes will therefore much depend upon the object which is to be obtained, and the nature of the structure affected:—thus, if repair is to be effected, the adhesive mode is attempted in every case; if an irritation is to be resisted, the inflammation will either tend to effuse lymph, or to pour out other secretions according to the functions and structure of the part:—thus a mucous membrane will pour out fluid—a serous membrane, lymph; in the former case there is an exit—in the latter there is not, and the fluid accumulating in the cavity would be injurious or destructive.

In every organ capable of effusing lymph, and requiring protection, this, the adhesive process, takes place, unless prevented by a faulty state of the constitution; thus it resists, or attempts to resist, the progress of disease from within as well as from without; it attempts to resist the spreading of the suppurative and ulcerative actions and sphacelus.

These laws, which are of universal application when a known and tangible cause of injury and irritation produce inflammation, are liable to be modified when it spontaneously arises, in which case it not unfrequently happens that the destructive modes are established to the exclusion of the reparative.

Remarks on suppuration.

Suppuration is established in every case in the first instance if it can better accomplish the object than the adhesive mode, as in cases of injury so severe that adhesion is impossible, when, after a slight effort to accomplish it, (which, however, is often attained in a part of the injury), the mode is changed, and the chasm is filled up by granulations, to which the formation of pus is accessory.

There is one use of pus which cannot be questioned, namely, to protect the new parts or granulations from the irritating contact of the air and other matters, serving the purpose of cuticle, until cuticle can be formed. And so essential is it, that no granulations under circumstances of exposure can be formed without.

Another use has lately been assigned to pus by Sir E. Home, which is, that of forming the new parts, itself coagulating like blood, or the lymph of the blood; and so arranging itself by the extrication of gas, as to form channels for the future circulation.

The quantity of pus is by no means in all cases proportionate to either of these purposes, and certainly the object to be obtained is best answered when it is small.

The quality of pus also varies much; there is a standard which affords a convincing proof of its being the product of those actions which are the most necessary and useful; and the more it departs therefrom, the more unfriendly is the character of the inflammation.

Suppuration not only takes place to forward the process of granulation, when that is rendered necessary by external injury, but it also is established to rid the body of foreign matter contained both under and above the surface; it occurs when the severity of inflammation prevents the adhesive process from being effected; when it would be injurious, as in canals and hollow organs which have an exit; and also as an inevitable result of the state of the constitution, as in small-pox.

Suppuration has generally been regarded as an unfortunate termination of inflammation, and so it undoubtedly is, when adhesion can be procured in most instances, and when resolution more particularly; but in some it is preferable, and in many cases of *spontaneous* inflammation it hardly should be disturbed.

Suppuration, like adhesion, can take place from any known tissue or structure, though much more readily in some than in others*; but in cases of limited abscesses formed spontaneously, it is usual to find the pus secreted from a cyst, and surrounded by adhesions, which prevent it from spreading †.

Inflammation seems a necessary precursor of suppuration, but the formation of pus is hindered by any great degree; although nothing tends more to reduce inflammation than its occurrence.

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* Bichat states, however, that there is a difference in the nature of the pus produced from each.—Vol. i. p. 87.

† There can be no doubt as to the use of the firm tumefaction round abscesses in walling in the matter, but there is one case which illustrates this in a very admirable manner as it seems to me; namely, when a bursa suppurates; for then, as there is a natural and sufficient barrier in the cyst, we find scarcely any surrounding adhesive inflammation, although the suppurative action in the bursa may be very acute.

When a cyst is formed, and the sides begin to secrete pus, the actions in the surrounding parts subside.

The suppurative action will be continued until the object for which it was established be accomplished, or until the state of constitution on which it depends is altered.

On the processes by which pus confined beneath the surface is got rid of.

When the pus, after it is formed, is contained beneath the surface, there is an immediate disposition produced to give it exit at the surface, and to prevent its spreading either towards the centre or laterally: to understand which it may be useful to attend to the following circumstances:

In common abscesses.

A foreign matter, either on the surface or under the surface, will occasion one or both of these effects; *i. e.*, it will either excite the absorbents to remove the part, or it will excite the nutrient vessels to protect it further by the effusion of lymph, and that process will be established which can best answer the purpose, provided it be attainable.

Now supposing the foreign matter is beneath the surface, as in the case of pus, the most useful purpose to be effected towards the centre or the sides is to effuse lymph, which is generally done; and the most useful purpose towards the surface is to remove the parts, which is also generally done*.

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* Mr. Wilson objects to the explanation by the effects of pressure, on grounds which appear to me to be insufficient, if the subject is viewed in the light now suggested.

" No one now doubts," he says, " but that the absorbent

Perhaps the pressure of this foreign matter on the parts may sufficiently explain the phenomena; for we constantly see, that parts cannot endure a certain degree of pressure if continued, and they are either protected by thickening or callus, separated by pus, removed by ulceration, or killed by mortification.

And what makes it more probable that, in the case of pus, it is the pressure which acts, is this; that if we, disregarding the processes of nature, make an opening at the upper part, it will not prevent the ulcerative process from occurring below also, the pressure still continuing.

The disposition, however, does not seem to be

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vessels remove the parts between the cavity of the abscess and the external surface; but we know not how they are excited to do this. We cannot account for their being stimulated by the pressure of the tumors, for any substance situated internally must produce an equal degree of pressure all round; therefore, were it so, an equal degree of absorption of the whole surrounding parts would take place: but absorption takes place on one side only; it cannot, therefore, be accounted for on the mechanical principle of pressure; it seems to depend upon some general law of the constitution, the wisdom of which we see by its effects, though of its immediate cause we remain ignorant."—P. 285.

I cannot help thinking the law may be that I have alluded to, and the cause, pressure acting in apparently opposite ways on the opposite sides of the abscess under the influence of that law.

confined to the mere parietes of the abscess, but is by sympathy communicated to the surface; and long before the opening has been effected, we can see by the processes going on in a particular spot, when that will happen.

When there is want of power:

When the adhesive process is sufficiently established at the sides and towards the centre, it rarely fails to occur, that the ulcerative process takes place towards the surface; but when, as sometimes happens, perhaps from want of power, or deficiency in sympathetic action, the neighbouring parts do not duly set up the adhesive process, then the matter makes its way through the parts which least resist, as the cellular membrane; or cause, ulceration towards the centre, as well as towards the surface, and makes a passage into some cavity or canal.

When the contained matters are particularly irritating.

It sometimes happens on the contrary, that from excess of sympathetic action the adhesive process takes place on every side*, which we find to be the case in those cases where the pus is particularly foul and irritating, as in the carbunculous, sloughy abscesses; when it would appear that nature makes particular exertions to wall in matters so irritating and injurious. Hence it is that we have the thickened, brawny state of the surface in these diseases, preventing the egress of the matter, which may, perhaps, also be partly attributed to the powers of the skin preponderating over those of the cellular membrane when set upon the same work; in the end, between the efforts to give the matter vent, and to confine it, partial ulcerations take place in the midst of great thickening; and the object is at last, though imperfectly accomplished, provided the patient lives.

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* The adhesive disposition generally exists towards the surface in a certain degree, as is proved by the readiness with which incisions heal, when made *prematurely*, into an abscess; but after a time, this gives way to the ulcerative.

Processes when the cavity of an abscess is exposed.

When the cyst of an abscess is exposed, there is a disposition to fill up the chasm by granulations, as in all other cases, provided this is not defeated by the situation of the opening causing matter to pond in the cavity, or the state of the constitution being unfavourable to any restorative efforts.

When matter *does* pond, there will be no disposition to heal over it, however far the track may be from this place to the orifice, and however closely we may keep the opposite sides in contact by pressure, the cavity may fill up to a certain degree, but a canal will still be left*.

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* I had a case a short time since which illustrated this very well. I removed a woman's breast, and soon afterwards she was attacked with erysipelas phlegmonodes, which produced abscesses both towards the sternum and scapula; the former readily filled up—the latter, from its depending situation, did not; although pressure was most carefully employed. She had suffered much pain in the operation, and for some time

Resolution, adhesion, and suppuration, may all be injurious.

Resolution, adhesion, and suppuration, are desirable processes or terminations, according to the purpose to be effected: on the other hand, they are, in other cases, of injurious consequence. Thus, resolution is mischievous if we wish to bring about adhesion; adhesion is so when it occurs where it ought not, as between the iris and lens; suppuration more frequently, as it is the reverse of adhesion, divides parts instead of uniting them, but also it often has its peculiar advantages.

Ulceration and mortification, although oftener injurious, are processes essential to the well-being of the economy.

Ulceration and mortification, although essentially destructive, have also their use; for it often happens that a part *should* be sacrificed for the sake of the whole, in which case absorption is, as Mr. Hunter has termed it, the natural surgeon, and he might have added mortification.

Thus, when parts cannot escape from pressure, they must be removed by the former, or be rendered insensible by the latter, and so interposed as a barrier between the cause and the sound parts. Ulceration separates or removes parts that are injurious, and makes way for the expulsion of foreign matters from the body.

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refused to allow me to make an opening, dreading the knife; however, at last she was compelled to do so by the deluge of matter which morning and evening flowed out of the wound, after which, in twenty-four hours the whole track, perhaps, of from three to four inches, between the original wound and the opening, had adhered firmly.

Ulceration, as a consequence of injury, generally tends to accomplish some useful purpose. When it occurs, or is maintained by the state of the constitution that is much diseased in common.

When ulceration occurs on the surface, pus is effused, as in the case of granulations, to protect it from the air; but, while the ulcerative action lasts, this pus is not healthy. When below the surface, as in bone or cartilage, it often happens that pus is not formed.

Mortification also has its use; for, supposing a part is so injured that it can never return to a healthy state and action, it would prove a perpetual source of irritation to the body, during the remainder of existence, but the economy possesses a power of killing it, and then the ulcerative process separates it. If a poison be applied, a slough is formed, as in some cases of pressure, to cut off the communication between the injurious cause and other parts, and thus protect them from its operation.

The danger and mischief which arise from these processes, either proceed from their being misapplied (if I may use such a term), or from their extending beyond the part.

The disposition to extend, *i. e.*, when the sympathetic actions excited are not of a nature to stop the progress and repair the mischief, but the contrary, seems chiefly to depend upon the state of the constitution, though it is much influenced by the nature of the cause and the structure of the part.

Inflammation occurs from certain states of the general system, imitating in its processes those which arise from external causes. In some instances a useful purpose for the system is evidently answered, although at the expense of the part; in other cases it seems to be an unequivocal evil, but still it may be the least evil of two, but this is conjectural.

Whatever has been said in ridicule of the vis medicatrix, I cannot help believing that many, very many, of the actions established in the economy, are efforts made by the constitution to remove or prevent the consequences of injury and disease; and further, that all medical assistance has for its legitimate object to check those actions, if excessive; to alter the disposition which renders them so, or perverts their character; or to excite them when deficient, or altogether wanting. These simple objects, however, are to be obtained by very complicated means.

I shall content myself with giving this brief view of the objects which nature (if I may so express myself) has in view in the processes of inflammation.—It would be impertinent in me to enter more largely on the subject. Mr. Hunter's work is studied by every one, and in Dr. Thompson's and Mr. Wilson's published *Lectures* are most excellent epitomes of that knowledge which we owe to him, and of that which has since been added by the labours of subsequent investigators and themselves; but, although this is true with respect to the common processes of inflammation, yet the subject of mortification, notwithstanding the great attention it has always excited, has been by no means so fully elucidated as the others; and hence I feel myself not only justified, but called upon, to contribute my humble endeavours in this department.

CHAP. VI.

ON MORTIFICATION.

In what it consists.

MORTIFICATION appears to be a peculiar alteration induced in the body, in which the fluids are coagulated, more or less perfectly, the solids changed in their texture, and the functions of the nerves and blood-vessels completely abolished; in short, a part so circumstanced is dead: but this is not simple death, from which the body, or a part, may, under some circumstances, be recovered; but it is an irreparable destruction of the organization and powers.

Commonly preceded by gangrene.

Gangrene most commonly precedes this state, and, indeed, it may be doubted whether it does not in every case. But gangrene is, in point of fact, one mode of inflammation, and many authors have denied that inflammation is, of necessity, a precursor of mortification. One only, as far as I know, has advanced the opinion that it is, and with him I should agree in believing that it is preceded in general, and invariably *accompanied* with some degree of it.

Stands in the same relation to inflammation as adhe-

But whether mortification be a consequence of inflammation or not, it may, perhaps with reason, sion, suppuration, and ulceration.

be considered as standing in the same relation to inflammation as adhesion, suppuration, or ulceration: they may all be preceded by a high degree, or it may be scarcely sensible. It is not improbable that they, as well as it, *may*, in some cases, be original actions, and that parts may adhere, suppurate, or ulcerate, without increased heat, swelling, or turgescence of vessels, without those symptoms which we denominate inflammation.

In most cases it is important to consider it as the consequence of inflammation of some kind or other.

But, whether mortification is the invariable product of inflammation or not, is by no means material in a practical point of view, for it often ensues so speedily on the application of the cause, that no available interval intervenes, before its occurrence, for the treatment thereof. In a great number of instances, however, it is the result of inflammation as much as any of the other modes here specified; sometimes inevitably,—sometimes it may be avoided: and this being the case, the best mode of considering the subject, with reference to practice, is, to ascertain in what cases mortification is immediately consequent on the cause;—in what it is the product of inflammation; and when so,—in what cases it can, or cannot, be prevented;—and, if it can be prevented, by what means, which will be best understood by knowing the nature of the inflammation which threatens it, or the particular causes which are apt to induce it.

And as these inflammations differ, a good arrangement of them would be very useful.

It will follow from this view of the subject, that a good arrangement is absolutely necessary to ascertain those distinctions by which the treatment must, in several instances, be guided: and I am not advancing too much, when I say, that, till of late, the opinions which have been held are peculiarly confused and defective, and the arrangements proposed, in many instances, founded on erroneous views in general pathology. This does not rest on my bare assertion, but is supported by authorities which will hardly be questioned.

Dr. Thompson's opinion

Dr. Thompson thus expresses himself (p. 502): "The various modes in which parts die, the diversity of causes from which their death proceeds, and the dissimilar, or even opposite, modes of treatment which those affections in different stages and in different circumstances require, render a careful investigation and accurate arrangement of the subject a most important object in the practice of surgery. In looking, however, into the different books of surgery and physic, which treat of mortification, you will soon be convinced that the subject has not yet received that attention which its importance demands. By an indiscriminate use of vague terms, and a careless arrangement of the phenomena of mortification, practical authors have scarcely left us an opportunity to profit, by the facts, observations, and cases, they have put upon record."—1813.

And a still more recent (French) author, who wrote the article "Gangrene" for the *Dictionnaire des Sciences Medicales*, published in 1816, gives us the following statement:—

M.Hebuardi.

"Art possesses a great number of means of opposing gangrene; the difficulty consists in making a proper selection. The precepts which the ancients have transmitted to us, have relation only to gangrene in general; but is it not manifest that an affection which appears under forms so various, ought to demand an equal variety in the treatment, and that what in one case would be useful, must necessarily prove injurious in another?—316.

"Authors who have written since (since this was proposed as a prize-subject, in 1769, by the Academy of Dijon), have thoroughly felt the necessity of directing the treatment of gangrene according to the causes, and the phenomena which it presents; but some have only given general views on the subject, and others have confined themselves to the description of some species: it is, doubtless, to fill this void that the Society of Medicine of Paris proposed, in 1807, the following question:—'*Exposer les caractères, les causes, et le traitement, de la gangrène, considérée dans les divers systêmes qu'elle peut affecter.*' The article, which I have inserted here, is extracted from the memoir which I presented to that society, and on which it was pleased to confer the prize for 1809."—HEBUARD, in *Dict. des Sciences Médicales.*

Summary of the views at present entertained.

Now it remains to be seen whether the avowed defects in this department of knowledge have been completely remedied at the present day. In the Appendix No. III., I have given a view of the various arrangements proposed by modern authors: from these we may collect that the differences of the following kinds have been recognised, and that their particular modes of treatment have been separately specified, *i. e.*, mortification from external violence, including contusion, laceration, and puncture, to which may also be added pressure. Those from chemical causes,—whether they are irritating or deleterious matters applied to the skin,—inserted into a wound,—or injected into the cellular membrane; or whether they arise from an excess of temperature. Those from causes affecting the organs of circulation. From distention. From deleterious matters taken into the stomach, or imbibed through the lungs.

In what these appear to be deficient.

Lastly, we have mortification treated of as the result of inflammation, and here I think there is still a failure in our present systems, which, whether we look abroad or at home, practically divide it into two or three species.

"For the sake of order," says Dr. Thompson, "I shall divide the observations I have to make on the cure of mortification; 1*st.*, into those which relate to the treatment of acute mortification, and 2*ndly*. into those which relate to the treatment of chronic mortification, commencing without fever, or attended with fever of a typhoid type. It unfortunately happens," he adds, "that in mortification, as in many other diseases, there are cases of a mixed nature, in the conduct of which very decided modes of practice will be found to be as uncertain in their principles as they may be doubtful in their effects."—p. 558.

And Mr. S. Cooper, in the last edition of that most valuable work, his *Surgical Dictionary*, thus expresses himself:—

"In the treatment, the surgeon will always have one thing for immediate consideration, *viz.*, whether the case before him is one of acute mortification, attended with inflammatory fever; or whether it is a chronic mortification, beginning without fever, or attended with fever of a typhoid nature? By making up his mind upon this point, the practitioner will establish a useful general principle for his guidance, especially in the commencement of the treatment."—p. 735.

Most other writers, French and English, but particularly the former, consider mortification as proceeding either from the *violence* of the inflammation, or from the malignity of the cause*, but make no further division. It is not my wish to make any cavil about the terms, but there are *many species* of inflammation which are either *apt* to terminate in mortification, or *inevitably* do so, from peculiarity of constitution, (as examples of the former, I may mention various forms of erysipelas; of the latter, carbuncle, *&c.*) and I should think it productive of no good consequence to presuppose the question, by ascribing the disposition either to malignity or debility, in any instance; but that it is of importance to recognise the fact that there is a difference in the nature of the various inflammations which lead to mortification. An illustration can add nothing to proof, but it may serve to render an author's meaning more intelligible, and, perhaps, from the analogy, convincing. I should say, then, that as many kinds of fever terminate in the typhoid state, so many inflammations end in gangrene; and that it would be as erroneous to treat these inflammations merely with reference to this threatened termination, as it would those fevers.

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* Mr. Burn, and other English writers who divide inflammation into the strong and weak, consider the latter as particularly prone to mortification.

The consequence of thus dividing the species of inflammation into two or three kinds only, has been, that what one author ascribes to violence of inflammation, another attributes to malignity; and what one will explain on the supposition of a malignity, another imputes to debility; and thus, on the assumption of principles which are undeniable only in a part of the cases which occur, we are left with uncertain or contradictory directions with respect to the remainder.

General principles which ought to direct the inquiry into the nature of mortification

The principle, then, appears to be, to observe and consider well the peculiarities of the inflammation which will end in gangrene, or threaten to do so; and, as in many cases it will admit of a more favourable termination, this must be sought for.—we must ascertain whether it admits of resolution, as in erysipelas; whether it may be rather induced to subside in suppuration, as from external injury; whether ulceration is the prominent feature, as in phagedæna, or hospital gangrene, which will influence a material difference in our applications; or whether mortification must be the inevitable result or principal character, as in carbuncle or gangrena senilis. We have to consider what measures are likely to conduct it to the most favourable termination, and what are best calculated to prevent its extension, for which purpose it is useful to inquire whether the inflammation is attended with action and power; much action, without power; or little of either the one or the other; which circumstances are very liable to be affected, or entirely governed, by the state of the constitution.

Two modes of treating of diseases: one by investigating their general principles and speaking generally of the plan of cure; the other by considering

I may further observe that, with respect to diseases, there are two modes of handling them; one consists in explaining their *general* principles, and the *general* principles of treatment adapted to them; the other of considering each kind specifically, and each species individually, and its appropriate treatment.

The latter mode has been least attended to in the works on inflammation and mortification.

that mode of treatment which may be best suited to it. Doubtless the difficulty and the importance of the former is greatest; and, when that is once accomplished, nothing remains but attentive observation to ascertain the differences of the various species; upon what these differences depend, and what conduct is most advantageous in them. It is certain, however, that when the first and most arduous branch has been completed, to the perfection of practical knowledge it is still requisite, that the latter should be also. Now it does appear to me, that with reference to the present subject, the first mode has been adopted almost to the exclusion of the latter*. One author will include all he has to say under the head of acute or chronic gangrene, and their treatment; another, under the head of remedies, such as blood-letting, cold, heat, or the antiphlogistic plan, generally, and so on. I would not be understood to object to this proceeding, but to advance the opinion, that the work is left imperfect, unless, after the general scheme has been made out, the particular parts are distinguished. If, therefore, I were to attempt to write on this subject, it would be with the design of treating individually of mortification as produced by the application of certain causes, or as the result of certain inflammations; and in the present sketch it will be my object to do so as far as I well can.

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* Le défaut de trop généraliser a, peut-être plus nui à la science, que celui de ne voir chaque phénomène qu'isolément. —*Bichat*, vol. i. p. 41.

With respect to the fever which attends gangrene or mortification, I must be permitted to express my doubts, whether a division into three, or at most, four kinds, will suffice; as also whether it is the most advantageous mode of considering the subject, to set out with the belief that they are either inflammatory, bilious, or typhoid.

The fever attending these cases has been considered as inflammatory, bilious, or typhoid.

When the state of gangrene is fully established, the character of the constitutional affection will be nearly the same, however different the cause may be; but in the earlier stages, the fever will vary as the inflammation.

If we strictly adhere to the meaning which has been attached to inflammatory fever; *i. e.*, if we consider it as analogous with sthenic fever, or *synocha*, it will rarely, if ever, be found to exist, excepting in cases from external injury, and prior to the occurrence of mortification.

Neither does it appear to me that the fever which accompanies the inflammation leading to mortification often accords with *typhus*. When gangrene becomes predominant, the constitutional affection certainly approaches very nearly to it, though, even then, there is a difference; that state is marked with extreme asthenia, but still it is peculiar; the very *appearance* of a man sinking under gangrene differs from that of one dying of typhus.

It is probable that each species of inflammation is attended with a peculiar modification of fever.

There are more cases which would deserve the name of *bilious* than any other; but, although disorder of the digestive organs is a predominant symptom, yet we must not consider the constitutional affection as the same. It is not the same in erysipelas, hospital-gangrene, or paronychia gravis, though neither are purely inflammatory or typhoid. The pyrexia which attends every species of inflammation is probably more or less *sui generis*, inasmuch as the disease with which it is connected is *sui generis*. The fever which attends phlegmon is not the same as that which is met with in erysipelas, nor that the same which attends carbuncle; the fever which attends inflammation of the mucous coat of the bronchiæ is not the same as that we meet with in inflammation of the mucous coat of the intestines, the mucous coat of the eye, or the serous covering of the lungs; that which attends compound fractures is not the same as that we meet with in burns; neither is the fever which attends one species of inflammation leading to mortification the same which accompanies another. This fact would be of no consequence, if it were not connected with treatment; but say, that bilious symptoms appeared in a case of carbuncle, and in a case of erysipelas, would it be wise to administer the same constitutional remedies in both? Should we do well to give large quantities of tartrite of antimony in the former, or administer cordials and support without reserve in the latter? It may be said that the typhoid character is more compounded with the bilious in the case of carbuncle, and that this leads to the difference in treatment. Be it so; but let the difference be recognised—green is compounded of yellow and blue, but it is neither yellow nor blue. It is difficult to disturb ideas once established, and to multiply fevers by the number of different inflammations would probably never be tolerated; but let us get rid of the term fever, and state the fact in plain words, and it may perhaps be admitted that the constitutional sympathy varies as the local affection.

When the system is mastered by the influence of gangrene or mortification, the state is nearly the same whatever the original inflammation or other cause may have been.

When the system is completely mastered by the influence of gangrene, it probably matters little what the cause of that gangrene has been; but as long as there is re-action, it is of considerable consequence to distinguish as before stated, whether that re-action is connected with any considerable degree of power or not, and with what peculiarity of disposition. In the first place, the object is to learn what may be the character of the inflammation leading to gangrene; and secondly, what the state may be when gangrene or sphacelus have occurred.

Important difference arising from the quantity

When the affection which leads to it is acute in its character, a quantity of fluids is contained and of fluids effused in the part or the extrication of air.

effused in the part, and it is denominated moist; while in those cases which are more slow, it is comparatively dry. It does not appear that there is any difference in the texture of the solids in the two states; acute or rapid mortifications are not, however, necessarily humid, as the slough from the application of kali purum proves, and the converse also is true in some cases of sphacelus senilis, *&c.*

Dr. Kirkland distinguished emphysematous gangrene as a particular kind.

It is very certain that humid gangrenes, which are also frequently emphysematous, are wont to spread with a great degree of rapidity; some authors have attributed this to the influence of the air extricated, and Dr. Kirkland has described emphysematous gangrene as distinct from the others, and some have imputed this disposition in a considerable degree to the putrefaction of the juices which are effused. With regard to the former, it should seem that the author alluded to has mistaken an effect for a cause; yet it is important to recognise the fact, that gangrene, when accompanied with emphysema, has a remarkable disposition to spread.

No doubt the presence of fluids in a state of putrefaction has a very prejudicial influence on the surrounding parts*, at the same time depressing their powers and exciting them to actions these depressed powers are not equal to; this will greatly increase the influence of sphacelus, and augment its tendency to spread. As Mr. Burn observes, the interstitial fluids of parts possess less life than the solids, and are *sooner* 'precipitated' to the state of death by what he terms the 'action of descent,' and consequently the larger the quantity of fluid; *i. e.*, the greater the swelling, the more rapidly will it be likely to spread, thus accounting for the remarkable progress where emphysema attends, which is a result of the same cause.

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* Mr. Burn states "that if putrid matter be applied to a wound, that wound never heals without sloughing."—vol. i. p. 460.

The remarkably strong disposition to spread may be ascribed partly to the original character of the inflammation, partly to the influence of these putrescent matters.

But it will *also* be observed, that in these cases this disposition may, in a considerable degree, be attributed to the original character of the *inflammation which* is greatly disposed to spread, and a phenomenon not uncommon further illustrates the fact, namely, that spots of gangrene shall appear in several places at once. Now, these being insulated, cannot be ascribed to the propagation of the affection from either of the circumstances mentioned above, but is a consequence of the original disposition.

The impression on the constitution is by no means proportionate to the size of the slough, but seems to depend upon its situation and particular nature.

There is another subject of inquiry of considerable interest, which will also tend to throw light upon this point; namely, upon what principle it can be explained that the constitution, *as well as* the neighbouring parts, suffers such a singular impression. By many it has been ascribed to the absorption of a deleterious principle, but this opinion is sufficiently refuted, as Mr. Burn argues, by the fact, that the impression is in no degree commensurate with the size of the slough, and consequently with the quantity of putrid matter, as the effects produced by a small slough of intestine or cornea will exemplify.

But it may be further observed with respect to the sympathy both constitutional and local; and the fact, although it does not oppose Mr. Burn's opinion, renders further explanation necessary, that it is by no means in proportion to the size of the slough, *when situated in the same part*; thus a slough from pressure, a slough from burn, or a slough from erysipelas, in the same situation, will produce a very different effect upon the constitution and neighbouring parts; it is therefore probable, that it is from the *inflammation surrounding the slough*, that such influence is communicated. If this inflammation is merely calculated to throw off the slough, little disturbance will be produced, if the powers are adequate, as generally happens in the first two cases; whereas, if the slough exists in the midst of an inflammation whose disposition is already unfriendly, then it will tend to augment this, and the constitution, as it were, conscious of its danger, and overpowered by it, will yield to its influence, as in the latter case and many others.

Upon the whole, then, I should conceive, that the singular impression communicated to the constitution and to the neighbouring parts, depends upon the peculiar character of the inflammation which surrounds the slough; yet that the putrid, offensive and irritating fluids contained in the slough are eminently calculated to give this new force and energy.

These points are not merely speculative, for the practice of surgeons was for a long time founded upon the opinions entertained respecting the slough.

The point now discussed is not merely speculative. The practice of the older surgeons was founded upon the doctrines which they held upon the state of the parts in mortification, and we cannot properly appreciate its propriety or impropriety in various instances, without bearing in mind the objects they had in view.

Opinions and practice of M. Quesnai more particularly considered.

It was supposed that the nerves were stupefied and their powers depressed by the violence of injury, or the depressing nature of the cause, or extinguished by its malignity; that the play of the vessels was lessened or destroyed by their being injured or stupefied, or compressed; that the fluids were rendered stagnant by strangulation produced by the irritation of nervous or tendinous parts, which, if it affected the veins, prevented the blood from returning, and occasioned much swelling and moist gangrene; if the arteries, no swelling, but dry gangrene was the consequence, from the engorgement, strangulation, or stupefaction; sometimes the fatty juices—sometimes the blood became stagnant in the part, and when these became putrid, they exasperated the state they produced.

They direct that the strangulation, real or imaginary, is to be set free by incisions; the fatty juices, when fixed, to be melted by relaxant dissolvents;—when the blood is stagnant, the vessels are to be excited into play again by stimulants;—when a part is stupefied, it demands cordials;—when infiltrations of natural or unnatural juices take place, they may excite strangulation, and require scarifications. If the part putrefies, the juices are to be let out by the same means, and it is to be embalmed through the cuts with essential oils, spirits, or aromatic powders; or it is to be dried by actual cautery, strong acids, or boiling oil; or even the occurrence of putrefaction is to be anticipated by pouring in boiling oil as in gun-shot wounds, or burning up the skin as in carbuncle. We are not to make an incision in carbuncle, boil, or abscess in perinæo or near the anus, because it is better to let the slough soak in pus, and because the pus will increase itself, and discharge the slough; but in some other cases, we are to let out the putrid pus, as good matter will not form till this is evacuated.

Gangrene, according to these doctrines, may be produced spontaneously by the *malignity* of the cause which extinguishes the life of the parts, and which is to be met with cordials and fortifiants, but is not to be prevented from depositing itself; or by its *caustic acrimony*, which burns up the part like lapis infernalis; but it is doubted whether the mere heat of the part is sufficient to burn it in a similar way, and therefore it is also doubted if ever gangrene is produced from the *violence of inflammation* simply.

Such are the leading doctrines, and such the practice of M. Quesnai, an author of most repute among the older surgeons upon this subject, and perhaps the view he has given, pretty correctly contains the opinions of the times in which he wrote, arranged and explained with ability that command our respect; but it is with some surprise that I have seen him quoted with so much commendation by *late* authorities every way entitled to our deference*. It will be seen that it is the system of this school of hot irons and boiling oil to assume the cause, and adapt the treatment to its supposed nature;—where we are so much in the dark, it is probably wiser rather to infer the nature of the disease from the effects of treatment.

Causes which are capable of influencing or accelerating the progress of mortification, briefly enumerated.

There are many circumstances which are capable of influencing in a very great degree the disposition of inflammation to terminate in mortification; whatever may have been the original cause of that inflammation, this is not to be wondered at, since most of these are of themselves capable of inducing the state of mortification. When they do so, they deserve separate consideration; but in every case of inflammation which occurs, where there may be any reason to fear this termination, it is necessary to bear in mind that their operation will much tend to *influence* its production, and many of them may be avoided by attention, or counteracted perhaps by proper means. They may be stated as follows:—

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* There is much valuable matter undoubtedly in M. Quesnai's work, particularly on the subject of contusions.

a. The powers of the part in which inflammation occurs being naturally weak, as in fibrous membranes, or in the scrotum, *&c.*

* *b.* The remote supply of blood or nervous energy, as in the lower extremities.

* *c.* Obstruction to the return of blood from depending position, pressure, or actual ligature.

* *d.* Obstruction to the supply of blood from pressure or ligature, rarely from the former except in aneurysms.

e. The circulating powers being impaired from disease in the heart or vessels.

* *f.* The powers of the constitution being enfeebled from age, the influence of habits, disorder of the digestive organs, or actual disease as fever.

* *g.* An impoverished or diseased state of the

blood, from poor living, foul air, improper food, scurvy, *&c.*

h. The organization of the part being much impaired by external injury.

* *i.* The nervous power of the part being impaired by poisons, *&c.*

* *k.* The actions of the part being unduly excited by any excessive irritation, particularly when its powers are weakened.

* *l.* The powers of the part unduly lessened by the unseasonable application of depressing remedies.

* *m.* The part being either subjected to pressure from some foreign cause, or produced by the tension of skin, or aponeurosis, *&c.*, in consequence of the swelling.

* *n.* The excessive violence of inflammatory action.

o. A peculiar disposition in the constitution.

Of these many may either be avoided, diminished, or counteracted, and such are marked in the margin *, and with respect to the remainder we are not without means of limiting or checking their influence.

The excessive violence of inflammatory action has been stated as a cause, but it is more frequently the consequence of the action of some of the above causes. *There must be a reason for inflammation being excessive.*

Under the heads *c*, *k*, *l*, and *m*, will fall nearly the whole of our remedial means; and upon the proper regulation of temperature, applications, medicine, diet, and depletion, according to the nature of the case, the success or failure of our efforts will depend.

PART SECOND.

ON THE DIFFERENT KINDS OF INFLAMMATION.

I SHALL now proceed to offer a few observations on the general principles which may be applied to the various leading divisions of inflammatory diseases, and on the particular nature of some of the individual species. They may first be divided into those which are produced by external causes; and secondly, those which arise from a disordered state of the constitution itself.

Those which arise from external causes may be referred to two heads,—mechanical or chemical injury;—and first of those

CHAP. I.

FROM MECHANICAL INJURY.

Its natural disposition is to repair, and that speedily.

INFLAMMATION from mechanical injury is far from being one and the same in all cases; but, like other inflammations, differs in kind as well as degree, according to the nature of the cause, (the injury), the part, and the constitution.

Beyond doubt its invariable *object* is to repair the harm that may have been inflicted, although the endeavour often fails of success; it must, therefore, be considered as a *natural* process, but it does not always follow that it should be a *healthy* one. In this respect, however, it differs from spontaneous inflammation, for that of necessity implies disease, while this may occur in perfect health. It differs also in another important respect; namely, that it always has a disposition to a speedy termination; *i. e.*, adhesion, suppuration, or slough; it also has universally a disposition to recovery. It is no objection to this statement that its termination is often prolonged by the presence of foreign matters, or its object frustrated by excessive violence.

And it is of the best kind.

When the constitution is sound, and the injury not excessively severe, the inflammation is of the best kind, and generally succeeds in re-establishing the integrity of the part by the effusion of lymph or the formation of granulations. There is probably no inflammation in which there is absolutely no attempt to effuse organizable lymph; but in these, that process is invariably present to a great degree*.

No sympathetic fever when process of adhesion takes place uninterruptedly.

When the process of adhesion takes place without any interruption, and perfect tranquillity is observed, there is scarcely any sympathetic affection of the constitution; when, however, this is not the case, fever attends, varying in kind and degree according to the circumstances of the part and of the constitution itself.

I do not here propose to consider the constitution as otherwise than sound, but supposing it to be so; important differences will arise from the nature or situation of the tissue or organ concerned, and from the nature of the injury.

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* When swelling comes on to a great extent, and with much rapidity, after an injury, as often happens in a limb seriously hurt, that swelling proceeds from the effusion of serous fluids, and is the result of an inflammatory action, differing in nature however, from the action going on in the part actually injured, and of itself would subside; but should the suppurative or gangrenous disposition extend to parts so circumstanced, they will have little power of resisting the one or the other.

NATURE OF THE ORGAN CONCERNED.

The principal difference depends upon its being an organ of vital or primary importance, or one of secondary consequence; it will be better, however, to reserve for a future part the remarks on the first.

The secondary are the common integuments, muscles and fascia, tendons, ligaments, bones, and some external mucous membranes, besides vessels and nerves.

INTEGUMENTS OR MUSCLES.—An injury of these will be, *cæteris paribus,* attended with healthy inflammation and vigorous action; its tendency to union or reparation by granulation, rarely to mortification, excepting in cases of extreme severity, or in unsound constitutions; they have great powers of repair.

TENDONS OR LIGAMENTS possess few vessels, and little nervous connexion; their dense structure will with difficulty admit of an increase of vascularity, and is the cause of an unfriendly pressure being exerted when there is, and from both these causes, inflammation, when it occurs in them, is prone to mortification under external injury with wound, unless that is a simple division, in which case they readily unite; but although they are incapable of bearing severity of inflammation from this cause, it is remarkable that in gout, rheumatism, or contusions, they will.

BONES.—There is seldom a breach of continuity in bones, without great violence has been inflicted; but, if the injury is not connected with a wound of the surface, reparation is, after a time, effected. If it is, a portion often perishes; for the same remarks which apply to fibrous membranes, do so here, with this difference, that of the two, bones are much more highly organized; their dense and unyielding structure, however, renders the processes of inflammation in them very tardy, and with circumstances of exposure unfavourable; when, however, there is no external wound, they rarely perish in case of fracture, although necrosis often occurs from blow, where there is no fracture.

Necrosis is rarely the result of blow, when there has been simple fracture.

The remarkable difference which occurs from the addition of a wound, deserves every attention; its cause does not appear to me to have been sufficiently explained.

Why should the addition of a trifling wound, to an injury of great severity, cause such a difference in the symptoms? It has been attributed to the *admission* of air; but to what extent *is* the air admitted?—Not beyond the mere surface*; it is not here, as in a case of abscess, where a *cavity* is emptied of fluid, and air may find access if the sides are not compressed. But if air does come in contact with parts, it does not prevent ready union. How many wounds unite after being long exposed, nay, after a part has been separated from the rest, and been surrounded with air? Air does not prevent the wounds of brute animals from healing. Still the cause of the phenomena must be ascribed ultimately to the influence of the air, though indirectly: the facts are the same, but they admit of a different explanation.

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* It is said that the union does not take place, as in simple fracture, because, from the exposure, the first bond of union,

The peculiar consequences which arise in compound fracture may be ascribed to the extension of the suppurating process from the wound in the skin.

As a contused wound of the *skin* will seldom heal by adhesion, the granulating process is necessary, and for this, suppuration. Now, in the case of compound fracture, *this* forms a part of the general surface of the wound, and the suppurative action having commenced in it, is communicated throughout, which would not otherwise have been the case, as is evinced by the difference, when adhesion in the skin can be procured.

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i. e., coagulable lymph, is removed or destroyed before it can become vascular. This undoubtedly is the case; but why is it so? We may with reason suppose that such parts of this lymph as the air has touched will perish; but in many instances the proportion so circumstanced is very trivial; and pretty surely if we can prevent the skin from suppuration, the uniting process does not fail beneath it.

And to the peculiar circumstances of a suppurating wound of which bone forms a part.

When bone forms part of a lacerated wound, the consequences are much more severe than in other cases; because, in the 1*st.* place, there is considerable disposition in it to perish under the high inflammation which ensues, arising from its structure. 2*nd.*—This disposition having commenced in a part, is, like any other disposition, capable of being extended to, or influencing, the whole surface of the wound, and adds to the tendency, already existing in its sides, to sloughing and unhealthy suppuration. 3*rd.*—The profuse suppuration which occurs, prevents, in a considerable degree, the restorative process of depositing matter to form new bone. 4*th.*—Because this matter tends to prevent that contact of the ends of the bones which is calculated to excite this process. 5*th.*—Because all processes performed in and by bone are slow; and, when any portion is exposed without periosteum, a very considerable interval, under the most favourable circumstances, elapses before granulations are formed, and, until they are so, the object nature has in view is not accomplished*.

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* The following case shewed very beautifully the processes which occur in a wounded and exposed bone.—A girl, fifteen years of age, received a compound fracture of the leg, from a fall off a wall; a projecting portion of bone was sawn off, and she was sent about twenty-four miles, into our hospital. The wound had been dilated, and was ample; a portion of the tibia, denuded of periosteum, was exposed to view, of its natu-

6th.—Because it is very difficult to avoid all motion, and every movement under such circumstances is a fresh injury. And, *7th.*—Because the repair being so difficult, the sympathetic fever is high in proportion, and tends itself still further to aggravate the mischief*.

Principles of treatment.

The principles of treatment seem to be,—*1st.* to procure adhesion of the external wound if possible, for which purpose any thing like tight strapping (which it is to be feared is often employed) must be injurious in a wound of this nature. Mr. Astley Cooper recommends, as the best application, a bit of lint wetted with the blood; and, *2nd.* to procure reparation of the bone, always effected readily enough, if suppuration be prevented by the success of the former intention; but, if not, perfect quietude is of all things the most essential. For this reason, I have, for some time, been in the

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ral colour. By degrees, a slight tinge of pinkish red was visible, and in the course of a few days it had the appearance of being injected. At the expiration of about three weeks, and not till then, a granulation burst forth near its centre, and very speedily it was covered with others; and they united with those which were situated at its sides, produced from the soft parts. When this object was effected, the secretion of pus considerably diminished: no portion of bone was at any time thrown off from this part; but I suppose the absorbents may have removed that which had been actually exposed.

* In Mr. Hennen's *Observations on Military Surgery*, there are some excellent observations on wounds of bones.

Disadvantages of bandages.

habit of laying the limb in that position in which the wound may be dressed without displacing the apparatus, whatever that may be; and have generally abandoned the use of bandages; for these require the splints to be moved, even when separate heads are employed. In the position on the side, this is of little consequence; but when the patient is on his back, which perhaps will be found the preferable posture in the majority of cases, the splints cannot be moved without disturbing the ends of the bone, and inflicting a new injury. There is no purpose of steadying the limb which may not be equally well accomplished by good pads, splints, and fillets, and I am entitled to say that since I have adopted this mode of treatment, I have found the management of these cases less painful to the patient, less troublesome to myself, and far more successful.

Compound fractures often do better when there is an extensive external wound than in other cases. Why?

It has been observed by many surgeons, and I believe is a fact, that where the external wound is large the case often does better than where it is small, provided that small wound does not unite by adhesion. For this, many reasons may be assigned. *1st.* The greater loss of blood at the time, in many instances. *2d.* The freer exit for blood and other matters effused both at the time and subsequently. *3d.* The relief which is obtained from the suppuration of a large external wound. *4th.* This process being effected more speedily; for the difference in this respect is in some measure the same, as between the *formation* of *an abscess* from inflammation, and the suppuration of an *open* lacerated wound; and *5thly*, Such a wound obviates the tension which perhaps is more mischievous than any thing. I cannot take upon myself to say that a practice founded upon this fact is to be recommended; but it seems to be defensible in every point of view where there is no hope of adhesion. The additional *pain* inflicted at the moment is not to be compared with that which arises from the high inflammation, and the openings we are subsequently obliged to make to evacuate matter, to say nothing of the increased risk to life and limb. I have never yet made incisions for the express purpose now mentioned, but where they have been for other reasons, as for instance, to facilitate the reduction of a bone, I have never seen cause to regret it.

The Nature of the Injury.

The kind of inflammation consequent on external violence is not only modified by the nature of the part and the state of the system, but varies materially from the modes in which it is inflicted, and they may be distinguished into three; namely, incision, contusion, and laceration.

INCISION.—The parts are divided in such a way, that no disorganization of the vessels occurs, and they are ready at once to execute those processes by which union is effected[*]; and so little difficulty is experienced in this, that there is scarcely any sympathetic action. If the disposition to adhesion is frustrated, still the parts have their perfect powers, the granulations and pus which are formed are healthy, and the termination favourable, unless it is complicated with the wound of some large vessel, cavity, or viscus.

Contusion.—A contusion does not necessarily imply a separation of parts, although this generally exists in some portion of the injury; the integuments at all events are left undivided. The processes of repair consist in the absorption of a part or the whole of the effused blood, in the re-union of the parts if separated, and the restoration of the whole to due power and healthy action.

As there is no necessity for, there is in general no disposition to, suppuration, and these processes are generally carried on uninterruptedly and with success; but should the skin subsequently give way, either from ulceration or mortification, we shall have a lacerated wound with all its consequences.

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[*] It appears to me, that of late from the fact having been ascertained, that the effused blood is susceptible of organization, the attention has been too much withdrawn from the sides of the wound; the blood effused in a lacerated or incised wound is the same, but the processes very different.

In the more violent cases the substance of the parts is broken down, the nerves lose their energy, and the vessels their power; and so circumstanced they allow, as M. Quesnai says, of the fluids being easily extravasated and forced into the part from the neighbouring arteries, and from the *engorgement* so produced, much of the mischief arises. Fluids so situated, he adds with reason, soon become acrimonious, and in proportion irritating and injurious to the vital powers.

Three stages which require attention in adapting our plan of treatment.

Very opposite remedies are employed in the treatment of contusions; such as lotions, cold and hot, sedative and stimulant, liniments, and fomentations. The propriety of the one or the other will be determined by circumstances. I believe any general rule on this point will be sometimes inapplicable, but considerable advantage may be derived from considering the contusion as passing through three stages, in each of which the remedies used should differ.

In the 1*st*. Parts are in a great measure deprived of tone by the blow.

2*d*. To this succeeds inflammation to repair the mischief.

3*d*. To the inflammatory stage, a state of atony.

These stages are recognised, at all events the 1*st* and 2*d*, in contusions of the brain; it is singular they should not in other cases.

In the *first* the object is to restore the part as much as possible to due power and vigour, and hence the use of applications containing spirit in various forms; of opodeldoc, *&c.*, as soon as the blow has been received.

In the *second*, if the inflammation runs very high, it may be necessary to apply leeches extensively and sedative lotions. The latter are in some cases doubtful remedies, and should generally contain a small quantity of alkohol; but the leeches are so beneficial, that it is often worth while to apply a weak saturnine lotion with or without spirit, or cold water, *on their account*; but if circumstances do not make them necessary, and no orifice of this kind, or other abrasion, forbids, the lotio muriat. ammon., considerably more diluted than that ordered in the Pharmacopœia; and if there is much want of power, applied warm by means of soft flannel, I have found the most useful remedy; but is injurious when the *skin* is broken, or *actively inflamed*, as well as the liq. ammon. acetat., *&c.* The feelings of the patient will often determine the important point, whether the application is to be used cold or warm, or if cold, when to be changed for warm. When there is much activity of inflammation, cold will be the most grateful and the most

In what cases leeches and sedative lotions, and in what, mild stimulating and astringent lotions are to be preferred.

serviceable; it will check the increased action, while the remedies with which it is combined give the tone to the parts they want. I speak from my own observation, and in opposition to the opinion of some eminent surgeons, particularly M. Asselini; for he applies to the treatment of contusions that energetic use of sedative practice which, though necessary in severe lacerations, I cannot conceive to be so in contusions; but while I believe the sedative plan is carried too far by some, on the other hand the employment of leeches, and applications of this kind, seems to be too generally condemned by others*.

The state of the skin to be particularly regarded, also extravasations of blood.

Some advantage will be derived from attending particularly to the state of the skin; in some contusions that is more injured than the parts beneath, and in such, especial care should be taken not to use either strong stimulants or sedatives, or astringents; and the same observation will apply where the skin is extensively separated by large ecchymosis. But when the principal mischief has accrued to the parts *underneath*, then I believe the practice recommended above will be found beneficial.

If matter should form beneath the skin, what conduct is most fitting to be pursued? I do not apprehend that after this unequivocally appears to be the case, any advantage is to be derived from delaying the opening which would soon take place, and probably by sloughing. Some authors condemn large openings in these cases; but it may be doubted whether the mischief which commonly follows the exposure of such cavities is not the necessary result of *any* opening in the state they are in, and would happen whether they are made large or small. It is worth while probably to try whether by a small aperture and gentle pressure, we can succeed in emptying and uniting such a cavity without inducing general inflammation of its sides; but if this occurs, and the formation of fetid pus is the consequence, as far as my own experience goes, a free opening is absolutely required.

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* I should say that this is too much the case in the practice recommended by Dr. Hennen in an article of high value on this subject.—*Obs. on Mil. Sur.*

In cases of ecchymosis, if it should be desirable to make an opening, (and this, without suppuration occurs, is rarely the case), that should undoubtedly be small, and deferred as long as possible, that the sides of the cavity may previously recover their powers. Generally a blush of inflammation forms on the surface where nature is preparing to expel extravasated blood.

The *third* stage follows the subsidence of the inflammation, and then the parts are left doubly weakened by the first injury and the increased actions which followed; if those actions are kept within due bounds, there is scarcely any third stage; but if they have been violent, a languid state of the parts, with œdema of the integuments, succeeds, in which warm fomentations and stimulating liniments are of the most essential service. The appearance of discoloration on the surface is often an indication of this stage.

LACERATED OR CONTUSED WOUNDS.—Whether the force has torn the parts by impression from without or from within, the injury is of the same nature, and may be considered as a contusion with a breach of surface.

Suppuration being in general the consequence of this breach will, as before explained, extend through the whole of the wounded parts, and reparation be effected by the granulating process.

Three stages. In this injury, as in contusions, there are three stages, of which the last may here be disregarded, but it is not equally unimportant to make no discrimination between the first and second; for I cannot conceive it is right to apply sedatives to a part, whose tone is destroyed, *before* re-action commences.

In the second, the object is to moderate the actions which must take place, to their due degree; and here we should not lose sight of the important fact, that these parts have greatly lost their natural powers.

Danger arises from the pro- The great source of danger is, from the occurrence of mortification; but this, when it exists, does not in all cases produce the same prejudicial effects.

bability of mortification.

It may be the immediate consequence.

When it occurs as the immediate consequence, as from a musket-shot, the part dies with such rapidity, that there is little or no struggle to prevent it, either in the neighbouring parts or general system; it dies, as from caustic.

Or the result of inflammation produced

But when it succeeds to the high inflammation, which is often set up to repair an injury so severe and so unfavourably circumstanced, it often spreads to the neighbouring parts, which, though not injured, have participated in the inflammation, or even to those beyond, which yield to the influence of the malady.

Much greater danger when bones or joints are concerned.

The danger to be apprehended from lacerations will depend much less upon their extent than upon the nature of the parts concerned; for, when soft parts merely are injured, the powers of nature can readily repair the injury: but, when bones, still more when joints, are involved, the processes which take place are defeated under circumstances of exposure by an external wound; the necessity and the difficulty of repair are rendered greater in proportion; and hence the severity of the symptoms in the first place, and their long continuance in the second*.

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* So much is this the case, that Mr. Guthrie and Dr. Hennen state that although gun-shot wounds of the soft parts in the thigh generally do well, yet, if the bone be fractured, upon an average two-thirds of the cases not amputated die.

Treatment of the inflammation.

In the treatment of lacerated wounds, leeches, cold applications, poultices, fomentations, spirituous lotions, *&c.*, have been recommended. The propriety of the one or the other will depend upon the object we have in view.

Leeches and cold applications are of the greatest service in reducing the inflammatory actions which exceed due bounds: the former may be applied to the immediate seat of the injury; the latter are used with more advantage at a distance from it; and they check the excessive circulation as effectually when liberally employed about a limb above the injury, as to the part itself. In the trunk they are less applicable.

To the part itself I believe a tepid and soft bread-and-water poultice is the best application; inasmuch, as its temperature neither acts as a stimulant nor a sedative, either of which impressions are liable to prove injurious to a part whose powers are much reduced; from the softness of its texture it is easier than any thing else; and, moreover, it disposes the wound to suppuration, which is the natural and best termination, and which, if it occurs, lessens, in a very remarkable manner, the tendency to mortification.

The cold lotion, applied to the limb above, may often, but not always, be advantageously medicated with alkohol, and also with lead, however contradictory such means appear. The time for fomentations is when suppuration commences.

At the expiration of five days or a week, if the case goes on favourably, the inflammation and sympathetic fever will subside, and the processes of suppuration, and the separation of sloughs, commence. In this state, warm fomentations and poultices, light nourishing diet, and attention to the state of the bowels, are the only measures requisite*.

When mortification ensues, treatment will be influenced by attention to two points, whether it is spreading from the violence of inflammation, or from its own impetus.

But if at the time we might expect these restorative processes to take place, mortification has occurred, and is spreading, it becomes us to inquire what plan we should pursue; and in this inquiry we must be chiefly guided, as it appears to me, by the observation of this difference, *i. e.*, either that the mortification is still spreading, as the result of excessive re-action, or, on the contrary, from *its own impetus*, if I may so express myself. In the former case, the heat and tension in the neighbourhood of the sphacelated part, and the force of the general circulation will be sufficiently manifest, and the anti-phlogistic plan the best to be pursued, to the degree that may seem beneficial: and here much scope must, inevitably, be left for the discretion of the surgeon. In some of these cases, an addition of spirit to the lotions is highly useful, but in many it certainly proves injurious. Where there is much irritability, small doses of opium in saline neutrals will *often* be of service, due attention being always paid to the bowels.

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* Guthrie, p. 57.

This is not the case in which we should expect benefit from bark; nevertheless, if a perseverance in anti-phlogistic measures seems not to answer,—if the local application of stimuli, cautiously used, does not appear of service, we are justified in trying it; but it must be remembered that it is an *experiment*, at the same time it is not an experiment of equal hazard with a copious blood-letting, or a full dose of opium, for these produce consequences which, if injurious, it is often beyond our power to control or recall.

The second case is, when the mortification is spreading with a rapidity which bids defiance to the former practice, and speedily depresses both the powers of the neighbouring parts, and of the system, to such a degree as to put all lowering plans out of the question. It is this kind which Dr. Kirkland has described as the emphysematous gangrene, and it must be met with prompt and decided measures, if at all. Amputation, when a limb is concerned, is often justifiable; but, should it not be resorted to, the adjacent parts must, if possible, be "fortified" against the evil, and stimulants, opium, and bark, be exhibited internally.

Opium, as has been stated, may be given before bark is to be tried, to lessen irritability; it may, for the same purpose, be combined with bark, and in any case where there is much pain, it may be exhibited at night, in full doses, and often with advantage.

If the situation of the disease is in a limb, it is useful so to place it, as to facilitate the return of venous blood which is apt to accumulate in this state, and which is most powerfully destructive of the vital powers.

Pressure, and tension which is one mode of pressure and, perhaps, the most injurious, must be carefully avoided.

Effects of pressure and tension.

External pressure excites increased actions of the vascular system to overcome the obstruction it produces, and if it exceed certain limits, it also occasions a disposition to remove the parts by the processes of ulceration or mortification, from the former—it augments the inflammation, from the latter—it gives the inflammation a tendency to an unfriendly termination*.

Tension is a mode of pressure occasioned by causes acting from within, and will be infallibly produced where there is much swelling beneath skin, or beneath aponeurosis, and the effect is precisely the same for the parts *pressed*, as in the former case, while the parts actually *stretched* are themselves undergoing a process, not less injurious.

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* Moderate pressure, we know, is often salutary; it supports parts which are relaxed and weakened, and, by this effect on the blood vessels, tends to assist the circulation: it also excites an increase of vascular action, and so far is beneficial.

When mortification has become predominant, whatever may have been the cause, the only endeavour must be to support the powers, with discretion proportioning the assistance to the necessity.

CHAP. II.

INFLAMMATIONS FROM CHEMICAL CAUSES.

THESE may be subdivided under two heads:—*1st*, Those from the effects of temperature; *2nd*, From poisons,—animal, vegetable, or mineral.

These agents differ materially, in their mode of action, from mechanical injuries; they impress a *peculiar* disposition in every instance on the parts they affect.

SECTION I.—*Inflammation from Excess in Temperature.*

IF heat be applied to any part of the body, it causes the vessels to be distended; it also occasions a feeling of uneasiness, often amounting to pain, sometimes intense.

Manner in which it acts, and processes which ensue.

Within a certain point, the derangement which occurs from its application, is only temporary: beyond this, inflammation takes place; and, if it be very severe, immediate disorganization, from the vital powers of the part being unable to prevent the coagulation of the fluids (which but for this cause would always happen at 160), or the contraction or crispation of the vessels, which those conversant with the injection of bodies for anatomical purposes know, begins to occur at about 120.

When disorganization is induced, it may destroy the life of the part irrevocably and at once, or it may (as happens from other injuries) inflict such violence that it is not in the power of the economy to restore it, but it does not die without a struggle, more or less,—longer or shorter; or it may exist in such a degree as to be capable of recovery under good management; or, lastly, there may be no disorganization at all, and the part inflames from this, as from other injuries (and not improbably as explained in another part of this work).

Whether the part returns to its natural state or not, for a time it remains red, and a painful sensation of heat continues, although the heat itself is withdrawn, and it is very different from that which is perceived when the skin is rendered red and turgid from any other cause. It is a perpetuation of the sensation of the hot body very analogous to what is observed in other cases; as for instance, when the taste of any particular substance is retained in the mouth, or a predominant colour appears after the eye is closed.

How does cold act in benefitting these cases? and how do heat and stimuli?

If the part is immediately plunged into cold water, this pain is relieved: if again taken out, or if exposed to heat, it returns or is increased: are, then, the nerves rendered more sensible to this impression? does the immersion in cold check actions on which the pain depends.

If the part be exposed to cold sufficiently long, it is found that the restorative actions have taken place without any, or with very little, pain; and that it has returned to a healthy state in many instances: but it is not a little remarkable that nearly the same phenomena will occur under an opposite plan, *i. e.*, under warmth and stimuli. May we suppose that in the first case the actions are moderated and kept within due bounds; and in the second, that they are better conducted to their termination under the influence of heat, *&c.*?

In burns, cold has an injurious effect; but in burns there is a great degree of disorganization, and whenever the powers are impaired by this cause, whether the vessels are bruised by violence or scorched by fire, they are not likely to act healthily or vigorously; but in scalds there seems no reason for supposing such want of power; for if, as I conceive, the quantity of heat developed by a part, may in some measure be taken as a criterion of the actions it is performing, this in scalds is great, and as these rarely terminate in sphacelus, we may also conclude that there is no want of power.

The thermometer a very delusive test of the pro-

I must here observe, that the information afforded by the thermometer is very delusive with respect to duction of animal heat. this matter; it will not at all ascertain the quantity of heat a part is giving off, or capable of giving off; for the thermometrical temperature of two parts shall be the same, the one being inflamed and the other near the centre of the circulation; but the quantity of fluid which the first will evaporate shall be two, three, or four times greater than the other.

Whatever may be the nature of the inflammation in scalds, it is certain, that this is not the only kind in which both heat and stimuli on the one hand, and cold and sedatives on the other, *are* of service, (though not in an equal degree); thus vinum opii, and steam, or saturnine lotion, will benefit the same inflammation of the eye: plunging a whitlow in hot water or in alcaline ley are remedies, and sometimes good ones; so are ice, or goulard. M. Dupuytren blisters an erythema,—we apply a cooling lotion.

That these opposite remedies do good is matter of fact,—that they act upon opposite principles we must infer from what we know of their usual effects on the healthy body; but what these are, remains yet to be explained.

Whatever may be the theory, the practice in injuries from heat is now pretty well settled.

Treatment. In scalds, the efficient use of cold will generally prevent or check the formation of vesications, but a more sedulous application is required than is generally complied with; if ever turpentine is to be preferred in these cases, it is from this reason, or others forbidding the use of cold.

If vesications form, it is best to prick them, and a continuance of cold will generally prevent further mischief; but if suppuration should occur beneath any of the blisters, it will be very apt to spread along the whole injured surface, and a frightful-looking sore is formed; but as this is only superficial, no permanent ill consequence will follow, and if it is guarded from irritation will generally heal in about three weeks.

Sores which result from injuries from change of temperature are excessively susceptible of harm from even a slight exposure to cold, and also from the contact of air. When the legs are the seat, a horizontal posture is particularly necessary from the beginning, and should not be varied from for a moment, until all danger of vesications forming is past.

During the first stage of burns, (which may possibly correspond with the first stage of contusions), stimulant applications are certainly the best.

When either from the extent or the situation of the injury, or any other cause, neither cold nor stimuli are admissible; the ol. lini cum aqua calcis constitutes a very excellent application.

Opium and cordials are often required in the first stage of injuries of this nature.

When much febrile re-action prevails, the injury is very great, and the patient robust, bleeding may be employed with much advantage. Opium may be used where there is much pain and irritation, without any risk of increasing fever. The bowels of course are always to be kept free.

Irritation of the mucous surface of the lungs or alimentary canal, is very apt to come on from sympathy with a large surface of injured skin, and will be best relieved by bleeding.

The sphacelus, which occurs as a consequence of excess of temperature, differs in nature from that produced by other external injuries, particularly mechanical, in having remarkably little disposition to spread.

Cold.—Perhaps the principle on which inflammation is produced by the application of cold is not so entirely different from that occasioned by the direct influence of heat, as might be at first supposed.

Principle on which cold produces inflammation.

Cold does not seem to produce inflammation *per se*[*]; a person or a part may be kept in a great degree of cold, and no inflammation will occur; but inflammation takes place when heat is applied to a cold part, and that is heat to all intents and purposes to a part which has been exposed to a temperature many degrees below the freezing point, which to others is temperate, or even cool [*], and while on the one hand such a part is liable to be very injuriously affected by a slight degree of warmth, so, its powers being much diminished, it is less capable of resisting an injurious impression of any kind, from the same reason that a slight degree of heat will produce vesications in a limb whose powers have been reduced by paralysis.

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[*] M. Larrey, Mém. de Chirurgie Militaire. Vol. iii. pp. 60, 61.

Observing, then, that parts exposed to violent heat inflame, if afterwards subjected to a mean temperature, but do not if gradually cooled; observing also, that parts which have suffered extreme cold also run into inflammation if subsequently exposed to a mean temperature, but do not if gradually warmed; we may infer that the inflammation in either case, is less the consequence of the immediate application of heat or cold, than of the sudden change which takes place; nevertheless I do not mean to deny the direct influence of excessive heat or cold; for when they are sufficiently intense to disorganize the parts by their action on the vessels, or the fluids contained in the vessels, they induce mischief which cannot be remedied by any thing but inflammation.

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[*] Pearson, p. 163.

Parts which have been affected by extreme cold should be brought to a proper temperature by degrees; but if inflammation has occurred from the omission of this precaution, I believe moderate warmth and stimuli conduct that inflammation to its termination better than any other means.

SECTION II. *Inflammation from Poisons*[*].

CERTAIN matters applied to the surface produce inflammation, the phenomena of which vary according to the peculiar nature of each; considerable differences are observable in its progress and mode of termination. They may be divided into three classes.

1*st*. MINERAL. The inflammation they occasion has little disposition to spread, often the contrary, as is particularly evinced by the nitras argenti; and perhaps the only instance of a contrary tendency is to be found in the eczema from the use of mercury.

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[*] It may admit of a question, whether the term poison ought to be used in a sense so general, but it is upon the principle, that every thing capable of exciting an injurious impression on the human body is so far poisonous, be it arsenic, or be it alkohol; and if they excite inflammation, this is the case. The difference between a deleterious application or poison and a useful remedy, only consists in the quantity, and the manner of exhibition.

Their effects on the parts is proportionate to the degree of excitement or disorganization they are capable of producing; when not diluted they are apt to cause slough, but some occasion pustules, as tart. antim.; their action is much moderated or prevented by cuticle.

When the inflammation these poisons produce is serious, and they threaten sloughing, I believe the best mode of treating them is as in burns,—at all events when the cause has been an acid.

There seems in all cases to be a direct endeavour on the part of the constitution to rid itself of mineral poisons, whether applied externally or internally.

2*d*. Vegetable. They act through the cuticle with much readiness but seldom to much depth, rarely proceeding further than to redden the surface or raise vesications; they will rarely produce mortification if they act on a healthy part and constitution.

3*d*. Animal. Are of two kinds; the one act violently and immediately on the part to which they are applied, exciting severe inflammation, but having nothing in common with the living properties of the animal, which therefore throw them off, if they are able to survive the first injurious

Two kinds;—one act immediately and violently—the other may enter and remain in the circulation—the latter belonging to other mammalia, the former to reptiles, insects, &c.

impression; such are the poisons of reptiles, insects, *&c.* Their *modus operandi* would appear to be by the direct destruction of the vital principle of the part or animal on which they operate, so that the beings which possess them effect by this means what others accomplish by their mechanical powers and offensive weapons.

The other excite less intense inflammation, have a certain relation with the vital properties of the animal in whose constitution they produce a peculiar alteration, but are sooner or later eliminated from it, if they do not previously destroy life. Such are the poisons of other mammalia, particularly of man himself.

The former class exist for the defence of the beings to which they belong; the second for the offence of others, for reasons which we can only conjecture, but the wisdom of which we cannot for a moment permit ourselves to doubt.

The primary inflammations which result from the latter class are in general of no serious import of themselves, and I shall reserve for a future part their consideration, as well as of those which result from the secondary affection they occasion*.

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* It may be observed that the actions of a part so inflamed are altogether peculiar; not only the secretions are so, as is proved in a great number of instances by the phenomena of inoculation, but the state of the surrounding vessels is also

A poison of the first class, as for instance of the viper, produces an intense degree of inflammation spreading very suddenly and extensively, accompanied with a great and rapid effusion, principally of serum, and with great loss of power, whence proceeds a strong disposition to mortify.

Treatment of the former.

The object of the constitutional treatment is to prevent death from taking place before the system has got rid of the poison, which it will do after a time, if it can resist the first impression. Cordials therefore are indicated in proportion to the violence of the symptoms, and ammonia is a very efficacious one; arsenic also is represented as a valuable medicine.

Locally we find, that if certain poisons produce a specific action of vessels, certain medicinal substances seem to exert a specific power in subduing this; such are olive-oil, ammonia, *&c.*

M. Boyer, in his *Traité des Maladies Chirurgicales,* has given a very instructive chapter on the history and treatment of the wounds of poisonous animals. He recommends the introduction of some liquid caustic into the orifice or orifices, so as to destroy the virus, and convert the wounds into an ordinary slough; for this purpose he prefers the

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sui generis in each, as is evident to the eye, which can at once recognise the kind of inflammation by the form and distribution of the increased vascularity. Can all these variations be explained by simple debility?

muriate of antimony, sulphuric or nitric acid, inserted into the wound on a bit of wood properly shaped; he then rubs the swoln part gently with olive-oil and ammonia, applies over the orifice simple dressing, and over the whole a poultice of bread and milk, and internally administers cordials, particularly ammonia.

It should appear that on the destruction of the cause by caustic, the effects immediately subside.

The treatment of these intense inflammations affords a good illustration of the fact,—that the most successful mode of combating inflammation is not always by those means whose property is to reduce power, and when applied to the healthy body, action.

CHAP. III.

INFLAMMATION FROM INTERNAL CAUSES.

HAVING considered those inflammations which owe their origin to causes whose operation we are well able to observe and to appreciate, we are in the next place to proceed to those which arise either from some defect inherent in the part, or some error in the constitution, be that what it may.

Modes in which diseases originate from internal defects.

Some parts are in particular individuals prone to disease, and the disposition is often inherited from parents; or, having once suffered from external causes, they are liable to a recurrence without a repetition of this agency, but simply from an error in health; in such cases a disordered state of constitution generally brings the disease into action. The causes of diseases which are of general application have been already briefly stated, p. 54, *et seq*. It remains for me to say, that whatever they may be, unless we are provided with a specific remedy, our chief means of curing or controlling them consists in correcting what is wrong in the functions of the digestive organs; in tranquillizing nervous irritation or disorder; in purifying and invigorating the blood by good air; and

General principles of treating disease.

relieving any undue excitement of the vascular system. Such is the rational plan of conduct recommended by Mr. Abernethy; and if it can be duly enforced, will, in a large number of instances, succeed in curing those which have not yet produced irremediable disorganization, and in relieving and controlling those which have.

Acute diseases or inflammations owe their origin to similar errors as chronic, and similar objects are to be pursued in their treatment. But the activity of the treatment must be proportioned to the activity of the disease, and that which is to be done must be done speedily;—remembering, however, that to irritate the nervous system either directly or indirectly, through the medium of the alimentary canal, is productive of mischief.

These are the general principles to be observed; but they are to be fulfilled in each particular instance by attending to the peculiarities of the inflammation which often render particular modes of attaining them necessary.

Much will also depend upon local treatment, which ought likewise to proceed upon the principle of controlling excessive action and soothing local irritation; but these objects cannot be accomplished by the same means in all cases, and therefore it is of consequence to recognise those differences in inflammations which require this or that modification of treatment.

Spontaneous inflammation the result of disordered health.

Spontaneous inflammation may with much probability be considered as the result of disordered constitution acting upon parts predisposed towards it, from causes of which we are often ignorant, although frequently they are very intelligible.

If this is permanent it constitutes a diathesis.

The state of the constitution may be permanently wrong, and peculiar, so as to constitute a diathesis, in which case any inflammation arising spontaneously will be impressed with peculiar characters, constituting peculiar kinds; as, the gouty rheumatic or scrofulous, into which I have no intention of entering, and indeed it would be impertinent to do so, as such excellent monographs exist upon these subjects.

There appears to be a peculiarity in the state of derangement in each kind of inflammation.

With respect to other states of constitution which produce inflammation, they are, as I believe, peculiar in each kind; if the state were always the same, we should have only one form; as phlegmon, or carbuncle, or erysipelas, *&c.*; but though peculiar, they are not, as in the former case, permanently so, and the person who now has erysipelas, may in a short time have phlegmon.

These disordered states of constitution are often owing to specific causes, either of speedy operation and short duration, as small-pox or measles; or of more protracted duration, as the venereal poison, *&c.*; but whatever it may be, if it does not constitute a diathesis, it will be my plan to give it a place in the table I have appended.

It is the object of this little work to add, if possible, to the knowledge, and to methodize the application of the principles of treatment to those of the disease; but first, to consider knowledge, derived from experience, as paramount; and, in investigating the principles, rather to infer the nature from the result of treatment, than to ground the treatment on the supposed principles of the disease.

It is not pretended to give any thing in the shape of a full or a detailed account of any one kind of inflammation: to have done so would have swelled its bulk to a great and unnecessary extent; but in a few instances where there seemed to be occasion for enlarging more than is consistent with my *general* plan, I have done so.

Spontaneous inflammations may be divided into two great classes: those in which the disposition to limit the progress of the inflammation, by the effusion of organizable lymph, predominates; and those in which, from the absence of this, it spreads[*]. The former is well marked in phlegmon, mumps, carbuncle, *&c.*; the latter in erysipelas, inflammation of the absorbents, and many cutaneous inflammations.

Cause of the tendency in inflammations to be limited or to spread.

The adhesions formed by the effusion of lymph, act as a barrier to the further progress of the disease, the disposition thereto depending mainly upon the constitution, as does the want of it also, in which case the inflammatory action is rapidly and extensively communicated.

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[*] As stated, p. 13.

In the former case a considerable quantity of serum is effused as well as lymph, in the latter it is almost exclusively poured forth.

Consequences of the spreading disposition.

From the extension of the inflammation in the latter description of cases, much greater sympathy is impressed upon the constitution, a singular alarm (to use an expression of Mr. Hunter's) is also felt; and from the unhealthy state, and often depressed powers, both of the part and of the system, there is a strong tendency to an unfavourable termination, *i. e.*, to sloughing and unhealthy suppuration or ulceration.

This statement must be admitted with some qualification, for there are some spreading inflammations so little serious in their nature, that they afford no grounds for such apprehensions: the greater degree of danger, however, which most of them induce, is, I believe, to be explained only upon the principles now stated.

Limited inflammations produce less impression upon the constitution, and, consequently, less danger: they are generally attended with considerable pain and heat, and are pretty rapid in their progress.

Inflammation spreading on internal surfaces may belong either to the limited or spreading type of constitution.

As we have assumed, and I believe upon sufficient grounds, that the disposition to limit, or spread, depends upon the state of constitution; therefore, where we find that the state of constitution is such as would have probably influenced the production of an external inflammation of a limited type, we must in strictness arrange under this class, inflammations of internal organs, although from the nature of the texture in which they occur, they spread; if they do so it is not from want of the contrary disposition, but from the efforts being defeated from causes to be explained when we come to speak of them more particularly.

The first class has three orders.

This being so, the Class we are now considering may be divided into three Orders:—

1*st*. Inflammation of organs of primary or vital importance.

2*nd*. Inflammation of organs essential to the well-being of the animal.

3*rd*. Inflammation of common parts.

The propriety of this division depends upon the fact that the degree of general sympathy is in proportion to the importance of the organ attacked, *cæteris paribus*, as before stated, p. 16; and the treatment to be pursued varies as this does.

SECTION I.—*Inflammation of Vital Organs.*

THE few observations which I shall offer upon the 1*st* Order, or inflammations of vital organs, may be divided under two heads: the nature of the organ affected, and the cause which has produced the affection.

Nature of the Organ affected.

First division of vital organs.

Vital organs are the viscera of the head, thorax, and abdomen. Of these, the functions of some are more immediately connected with the support of life than others; and, when the former are concerned, the sympathy of the whole system will be more remarkable; such are the stomach, small intestines, brain, and the heart. This sympathy is often attended with singular depression of the nervous powers, and weakness, or irregularity of vascular action; so much so, indeed, as to lead to very erroneous ideas respecting the nature of the malady, unless this matter be well understood.

Second and third divisions.

The lungs, liver, and kidneys, perform offices on which life also depends; but, although the interruption of these will, sooner or later, be followed by death, this consequence is not so immediate, nor are the attendant symptoms so urgent.—This is still more the case with the pancreas, spleen, bladder, and uterus. Inflammation of the last rarely takes place without being communicated to the peritonæum; and when this happens as well as in the former, we have all the consequences of peritoneal inflammation to expect.

Why inflammation is so apt to spread on serous membranes, and why it is so serious in its consequences.

Inflammation affecting *serous membranes*, however it may originate, is highly dangerous, because it surrounds all the viscera, and there is always more or less disposition to communicate it to them: hence it produces a great alarm in the constitution: because also it has, from its affecting a surface, and more particularly from the nature of that surface, a strong disposition to spread: (perhaps serous membranes *are* so very prone to spreading inflammation from the circumstance of their being ordinarily exempt from all injurious impressions, and therefore may be less capable of resisting them when they do occur:) and because all the results of inflammation, except resolution, must be productive of consequences injurious to the functions of the organs they envelop, even in the most favourable case,—that of adhesion; and destructive generally in the others, *i. e.*, where they occasion sphacelus, or even suppuration.

The disposition to adhesion certainly predominates, and that for reasons which Mr. Hunter has assigned; namely, because effusion of any kind of fluid into a shut cavity is injurious, and therefore, under inflammation, the *natural* disposition is to exclude this, and it rarely occurs excepting under an uncontrollable degree*.

How far mucous membranes situated in the interior of the body, may be regarded as external surfaces.

Mucous membranes are not, in themselves, vital organs, but frequently become so from their relations. Some are situated externally, as on the eye, glans penis, *&c.*; many others may, without any great violence, be considered as external, as the membrane which lines the fauces, nares, œsophagus, and even the bronchiæ.

Where the mucous membranes are covered with an epidermis, or simply secrete mucus, to guard themselves and the organs they cover from any irritating impression, their properties bear a near resemblance to those of parts which apparently, but perhaps not more strictly, form a portion of the surface; but, when they become organs for the purpose of producing peculiar secretions, the case is altered, and in the stomach and intestines they may be considered vital.

Important consequences arising from their disposition to secrete when inflamed.

But the nature of their functions, even in this case, produces a wide difference in the progress, character, and treatment, of the inflammations which affect them, for they all are naturally disposed to secrete, and, when the secreting process is established, inflammation is disposed to subside.

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* Or of a peculiar kind, as in some cases of dropsy.

When the inflammation is carried to excess, they may throw out lymph or slough: it may also be their original disposition to ulcerate or slough.

Differences when they effuse lymph, or when the subjacent tissues are affected.

Where it is their original disposition to throw out lymph, as in the Eustachian tube, larynx, or trachea, there will be found a remarkable similarity between the character of the constitutional affection, and that which obtains where lymph is effused under any other circumstances: it may also be observed that when the inflammatory action is extended from a mucous surface to the subjacent tissues, a similar difference in the affection of the system may be observed; as in bronchitis and enteritis, when compared with catarrhal inflammations of these respective parts.

Practical inferences.

The practical inferences to be deduced from the knowledge of the disposition of inflammations, are exceedingly important; for example:—in such structures as these we have now been considering, if we have reason to believe that they will terminate by secretion, and that secretion will not, from its situation, confinement, or irritation, prove particularly injurious, we are little anxious to arrest its progress by bleeding, which, indeed, might defeat the curative processes of nature in some cases, and protract the disease; or, might cause the secretions to become too copious from want of tone. But where the tendency is to destroy the organization of a part of importance, we cannot use too active endeavours to check it; and, as if conscious of the difference, the constitution is tranquillized, and its state improved, in the latter instance, by the same means which would have rendered it more unfavourable in the former.

Fibrous membranes, unmixed with serous, as the dura mater, seem much less disposed to communicate inflammation to the organ they invest than the latter.

Causes which produce Inflammation in Vital Organs.

Causes of inflammation of vital organs divided under five heads.

They may be arranged under the following heads: 1*st*, external injury; 2*nd*, changes of temperature; 3*rd*, the suppression of some disease or wanted discharge; the repulsion of eruptions; or some specific diathesis, as gout, rheumatism, *&c.*; 4*th*, the introduction of some morbid poison, as of typhus, measles, *&c.*; 5*th*, from the mechanical irritation of some other disease, as of tubercles, calculus, *&c.*

The consequences which arise from a wound not directly referable to the admission of air.

When vital organs inflame from external injury, it is generally implied that the cavity which contains them has been opened*, and, whether the viscera have been wounded or not, inflammation will probably take place in the serous membrane. This, and the very mischievous consequences which often follow, have been ascribed to the admission of air; but the same arguments which have been already employed in speaking of compound fracture may be again stated against this opinion. But there is one accident which particularly seems to disprove it. The lungs and pleura are often wounded by a broken rib, and air expelled in large quantities into the thorax, and under circumstances of great irritation; yet there is no comparison between the danger of a wound thus inflicted and in one *from without*, although all circumstances are the same as far as the air is concerned.

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* This is not necessarily the case, but it is remarkable what severe blows, unaccompanied with wound, may be inflicted on the viscera of the abdomen without any serious consequences.

Mr. Hunter's opinion doubtful.

Mr. Hunter explained the rapid, severe, and general inflammation, which occurs from a wound of a cavity by referring it to the stimulus of imperfection, on the supposition that the general disposition to inflame arises from the cavity being rendered imperfect in a part. To this the following objections may be made:—

1*st*, If the cavity is rendered imperfect by a cause acting from within, as from the point of a broken rib, an equal disposition is not excited, as from a wound through the skin, although the imperfection is of the same kind. 2*nd*, In the case of paracentesis, the peritonæum rarely inflames, although it is rendered imperfect. 3*rd*, Although it is not rendered imperfect by strangulated intestine, yet inflammation is greatly disposed to spread over this membrane. *4th,* If the state of contact between the viscera and peritonæum be considered, it is not easy to conceive how the *cavity* is rendered imperfect by a wound in any part of that membrane.

The usual effects of the adhesive process defeated by the remarkable rapidity with which inflammation spreads over serous membranes, and the constitutional sympathy is great in proportion.

But whether a membrane inflames from the contact of air, the stimulus of imperfection, or the extension of the disposition from the wound in the skin over a surface which readily and rapidly participates in an affection of any part of it, and with such rapidity indeed that it may easily be supposed, that before adhesions form in one part, the disposition has been propagated further when it is active, (and hence the benefit obtained from the adhesive process in general is lost): whether this be so or not, the consequence is, that the system sympathizes intensely, and the effect of this sympathy is to increase the mischief.

Great difference in the severity of inflammations of vital organs from wounds and from other causes.

There is a remarkable difference between the severity of inflammations in vital organs when produced by wounds and other causes, even although the constitution in the former case shall be more healthy than in the latter. This may perhaps be accounted for in the following way:

Attempt to explain this.

In spontaneous inflammations it is not *necessary* that effusion of any kind should take place, and therefore it often happens that the inflammation resolves without any; at all events this takes place reluctantly, and *gives time* for the interference of medical assistance to prevent it. But when a wound has been inflicted, the injury *cannot* be repaired without effusion; and if that disposition once extends beyond the edges of the wound, it will perhaps pass over the whole surface; the consequence will be, that the general sympathy will be great in proportion, (as even lymph effused will tend to impair the functions of the part, *i. e.*, to disorganize it); and, from the intensity of the sympathy, the inflammation in its turn will be increased, and lead to the fatal consequences we often witness.

With regard to the treatment of these cases, there is a better chance of preventing the mischief, than of curing it; and there is a better chance of curing it before much sympathy of the system has been excited than afterwards.

Remarks on the principle of treatment.

Where nature is herself capable of curing disease, we should do well to observe her processes, and to imitate them; for she is not to be thwarted but obeyed*. If a man receives a wound in a vital part, we observe that he drops in general, and there he would lay perhaps in a state of inaction, and under the influence of privation, if he were not removed. The wounded soldier does often remain in such a predicament, without help, but without the stimulus of warmth or food, and the processes which are immediately consequent on the wound are not defeated by these causes, and by being moved prematurely; while his comrades, carried to a crowded house or hospital, very frequently die. As syncope from hæmorrhage, though alarming as a symptom, is beneficial as a process; so, the sudden and entire loss of power which often follows a wound in a vital part, may contribute greatly to prevent mischief by the contraction of vessels it occasions, and its incapacitating the individual from moving or procuring food.

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* Those who utterly deride the vis medicatrix will view such reasoning with contempt; but I confess, when I observe that the whole structure and economy of every animal is most admirably calculated to contribute to the perfect enjoyment of health, I cannot but believe that as accident and disease must be unavoidable, that they are also so constituted as to repair the one and resist the other; neither do any of the phenomena of

The mode of treatment of these cases enforced by medical officers of the first ability, accords entirely with these principles, and there can be no

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disease I have yet seen give me any reason to doubt this. It does not follow that the attempt is not made because it does not succeed; such an inference would not for a moment be admitted in any human affairs, and as man and other animals are constituted for a certain period of existence, they are endowed with such powers as will preserve them through the average share of injuries to which they are from any cause exposed; a fact not to be denied, however the cause may be doubted.

further inference deduced from them, but that it is of particular consequence, *if possible*, to insist upon an entire negation of stimulus and motion for a considerable period after the injury; for the first forty-eight hours especially.

Inflammation arising from sudden changes of temperature does not of necessity presuppose any disorder of the constitution. Inference with regard to treatment.

Sudden change of temperature very frequently proves a cause of inflammation of vital organs. This species of inflammation resembles that from external violence in one respect; that is, in not depending of necessity on any preceding error in the constitution, a fact of some importance with reference to treatment.

Various degrees and kinds of disorder of internal organs are frequently relieved by the occurrence of external inflammation in the shape of gout, rheumatism, erysipelas, eruptions, or by a discharge from some surface, which being repelled or suddenly stopt, the original disorder recurs or inflammation ensues.

From the repulsion of external inflammation or the cessation of disease.

When inflammation arises from any such cause, it presupposes a disordered state of constitution; it is never of so pure a kind as it may be from injury or temperature, and this requires consideration in the treatment, as an unsound condition of the vital, particularly of the digestive organs, will often render a considerable difference in the plan necessary. The re-production of the original disease, if possible, or the substitution of another by blisters, sinapisms, *&c.*, is also a principal indication.

From morbid poisons.

Inflammation is also frequently produced by the introduction of morbid poisons, which may either attack external parts or vital organs; may vary from acute to chronic. In these cases there is invariably a considerable degree of disorder superadded to the common effects of inflammatory action; in some, this may be sufficient to give that type to the fever and inflammation which is denominated asthenic; and it may either arise from the previous state of the system or condition of the patient, which perhaps causes the difference between distinct and confluent small-pox, measles of a good or bad kind, scarlatina simplex or maligna, and so on; or of the poison itself, as of plague, typhus, *&c.*

Those inflammations of vital organs, whose type is commonly called sthenic, I should venture to class with this division; while the asthenic I should refer to the second, as more analogous with those of external parts whose disposition it is to spread.

ORDER SECOND.

Inflammation of Parts of great, but not vital, Importance.

Intermediate between those in vital organs and common parts.

Although the safety of the whole may not be immediately affected, indeed if not at all compromised by the seat of the inflammation; yet, if it be in an organ whose integrity is of great consequence to the perfect possession of all the faculties and functions of the individual, we shall find that it is connected with the vital organs by a very close sympathy; that great precautions are employed to guard it from injurious impressions, and great efforts are made to repair it when injured. Inflammations of the joints, the eyes, and the testicles, afford the most striking proofs of these facts. From this circumstance we find it necessary in the treatment to proceed with a degree of energy not much inferior to that which would have been required if the organ had been vital; perhaps the inflammation in either case may require equal means to control it, and in the case of joints it may, and often does, endanger life; in the others we are contending for a less stake, but always one of great consequence.

Inflammation of Joints.

From wounds, particularly severe. Why?

This may proceed either from wounds or from constitutional disorder, excited probably by some external violence or cold. That which arises from wound is infinitely the most severe after it has once commenced.

The great violence of inflammation from wounds may perhaps be accounted for, not only from the importance of these parts, but from the circumstances belonging to their structure and functions, which render the processes of cure particularly difficult.

The repair of wounds is effected by the effusion of organizable lymph; but if this were the usual consequence of inflammation in joints, anchylosis would be the result by which their function would be destroyed; and for this reason probably they are little prone to effuse it, certainly in common inflammation. Again, if they do so when wounded, the copious secretion of synovia will tend to wash it away; and not only so, but by distending the capsule, when the opening is not large, prevent that contact which is also so essential to union. By all these causes the efforts at repair are rendered in a considerable degree fruitless; but the efforts of the system are increased in proportion to the difficulty and the necessity of the case, and hence the intense character of inflammation after wounds of articulations, the processes of which have been most perspicuously described by Mr. Astley Cooper*. The cure is at length accomplished by granulation, but much, if not entirely, at the expense of the function of the joint. Joints too are *par excellence* moveable, but motion in inflamed parts is highly injurious; hence we have a similar cause acting to defeat the end of inflammatory actions, as in the lungs, larynx, *&c.*; and it is very difficult to control this altogether, for an apparatus, without the greatest care, may be displaced, and a momentary error lead to permanent mischief: it is from this cause, perhaps, that joints with flat surfaces suffer so much less than others when inflamed.

Usual termination of inflammation also denied in spontaneous inflammations.

When joints are not opened, the usual terminations of inflammation are denied to them, for it has been stated by Mr. Hunter, that canals and open cavities are disposed to pour out secretions, but shut cavities to effuse lymph; in the present instance, however, it is the natural disposition to pour forth secretions; *i. e.*, synovia, and it is only under a very severe or long-continued inflammation that an unopened joint throws out lymph, and when it does, from the causes above assigned, the objects of this process cannot be attained until an opening has taken place in consequence of the disease or by art.

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* *Surgical Essays*, Part ii. p. 104 et seq.

These are the chief physio-nosological circumstances (to use a very expressive term which Mr. Abernethy has adopted) causing the peculiar characters of inflammations of joints; which principally consist in their disposition to continue for a length of time, and, if severe, in inducing great constitutional sympathy. I may observe in this place, that they afford an excellent illustration of the principle, that the degree of this sympathy is in proportion to the importance of the part. Thus, the effect produced on the constitution by disease of the hip, is far greater than by that of the knee, and this more considerable than of the ankle, although the extent of surface in these several joints does not greatly differ, and although the distance from the centre would give an unfavourable disposition to the latter; but then the whole lower extremity is dependant upon the hip joint,—the foot only on the ankle. In fact, it cannot be too strongly enforced that the sympathy of the system is by no means in proportion to the size of the part affected.

Illustration of the principle that the sympathetic effect on the constitution is in proportion to the importance of the disease.

On the management of joint diseases, little remains to be said, the profession are now so well informed on the subject, greatly owing to the labours of Mr. Brodie; for it is by discriminating the particular nature of each case only, that we can arrive at any certain principles of conduct; and for the power of establishing such discrimination, and of determining the nature of the remedies

General remarks.

appropriate to each, we are chiefly indebted to him.

The most exquisite cases of inflammation of joints occur from wounds, and these are much aggravated by laceration, the presence of foreign bodies, a rough surface presented to the irritable synovial membrane, and by an unsound state of the constitution. The picture of these cases, drawn by Mr. Guthrie and Dr. Hennen is not overcharged; and to their pages I should refer for the most valuable information on this subject generally. In civil life, wounds of the ankle-joint from compound fracture and dislocation, are the most common; and on this subject Mr. A. Cooper has collected a great mass of valuable information, and has, perhaps, as far as may be practicable, laid down the rules of conduct with respect to amputation; in this particular, however, surgeons in the metropolis and in the country will find it necessary to make considerable allowances for the different results which might be expected in similar cases, and which differ to a degree scarcely to be imagined. The work to which I have referred, contains copious reports from both.

Every kind of joint disease of spontaneous origin, and every species of inflammation of articulations, requires some modification of local treatment; but, where there is no specific diathesis, there is no description of case in which that attention to the general health which Mr. Abernethy has enforced, is more particularly necessary.

In inflammation of *joints, from wounds,* the principles of treatment appear to be these: perfect quietude; cool air; ample depletion, local and general; the energetic application of cold; the lowest possible diet; gentle saline laxatives with antimonials; and opium, if necessary; after a while, soft poultices and fomentations.

In *spontaneous inflammation of joints:* perfect quietude; local depletion; evaporating poultices; mild, unirritating, but nutritive, diet; attention to restore the healthy action of the digestive organs, and restore the secretions from the skin; opium, to relieve pain; and, after a time, counter irritation by blisters, first at a distance, then in the neighbourhood of the joint.

Inflammation of the Eye.

Speaking generally, we are warranted, I think, in separating inflammations of these organs, from those of common parts; but in its slighter forms such a distinction is hardly necessary.

The eye consists of a number of distinct structures, each of which has its peculiar properties and functions, and, when implicated in inflammation, gives rise to a peculiarity of symptoms. It is also liable to the influence of causes proper to itself, and to suffer from constitutional disorder of various kinds; from these circumstances, a great variety occurs in the nature of the inflammations which affect it, which have received their full share of consideration in the writings and practice of modern surgeons.

The phenomena of inflammation of the eye are peculiarly calculated to illustrate the principles and laws of inflammation.

The general principles of inflammation, which it has been my endeavour to support, will, I think, find some confirmation in the phenomena which the inflammations of these organs exhibit. In the first place, it is perfectly well known that when ulceration, abscess, or sphacelus, are spreading in the cornea, still more in the globe, the constitutional sympathy is far greater than when the mischief is arrested by the effusion of organizable lymph, and that if this can be procured by the use of arg. nitrat., remarkable relief is obtained with respect to the general symptoms, while on the other hand those remedies which will correct, subdue, or change, the state of the system, will influence the progress of the disease in a manner no less remarkable; and as these are processes which we can actually observe and watch, as much as if they were experiments contrived in the most delicate manner, they possess particular value. In the second place, this sympathy is much less when the conjunctiva, or integument, of the eye is alone concerned, than when the more essential parts are so, and there is risk of disorganization. And, in the third place, it may be noticed that each kind of inflammation of the eye has its own peculiar disposition to terminate in one mode or another:—in some, this is effusion of puriform mucus; in others, in vesicle and ulceration; in others, in adhesion or abscess; in others, in sphacelus; and in others again, to persist merely as inflammation.

Inflammations of the Testis.

Two kinds: the acute and subacute.

The inflammatory affections of this gland may be divided into two kinds: the acute and subacute.

The acute.

The acute may arise from injury, from gonorrhœa, from translated mumps, from rheumatism, gout, or scrofula.

The subacute, from irritable urethra, scrofula, venereal disease, or simple constitutional disorder.

The acute are attended with great constitutional sympathy from the connexions and importance of the gland, from its nervous sensibility, from the pressure of its dense coats, and from its depending position.

Very little disposition to suppurate.

It has less disposition to terminate in suppuration, perhaps, than in any other gland of the body except the salivary. If properly treated, it is ready to resolve in most cases, although induration is sometimes the result of the adhesive process taking place.

The induration which succeeds inflammation of the testis from gonorrhœa, may be disregarded; but that from blow not unfrequently lays the foundation of destructive disease.

Difference in treatment governed by the cause.

In the treatment, it is of importance to consider the difference of the cause: thus, in mumps and rheumatism the constitution is chiefly to be attended to, and cold applications are certainly improper. When it arises from blow, after leeches have been freely employed, it appears to me that fomentations are the best remedy. This, however, is not the case in a great many instances of hernia humoralis from gonorrhœa, where cold applications seem, upon the whole, to answer the purpose better; but the feelings of the patient will best determine the point. I have conjectured that the reason why hot applications are often less advantageous than cold, in inflammation of the testis consequent on gonorrhœa, is this, that the cause which originally produced it is still in existence, and therefore we may increase the effect until the symptoms are decidedly on the decline: but, whatever may have been the cause, after the first violence of the inflammation has subsided, fomentations and bread-and-water poultices are in all cases desirable, and other means calculated to resolve the disease completely.

I have seen the fever as high, and the affection of the system as severe, from inflammation of this gland as from any other species of inflammation I ever witnessed; the depression, faintness, and sickness, completely subduing the individual; the pain in the head intense; and, had not the cause been known, the patient's life must have been concluded in imminent danger.

In the severer cases copious blood-letting from the arm is necessary: in others, leeches will suffice. Calomel and antimony (if the stomach will bear it) are very useful with neutral salts.

Effects of mercury in cases of inflammation.

It appears that mercury has a very remarkable power of removing acute inflammatory action of the large glands, in combination with other suitable means; but its anti-inflammatory properties, have, perhaps, been extended too far. In serous membranes also, and inflammations of some other parts, as of the eye, it is decidedly useful; but in inflammations of the skin, mucous membranes, cellular membrane, *&c.*, it is often injurious.

In subacute cases, the beneficial or hurtful effects of mercury will depend very much upon the degree to which it is carried, and the irritable or inirritable nature of the constitution.

When the object is to stop acute inflammation, calomel seems to be a preparation of far greater power than the others, and of very different effects; and it is often most advantageously combined with the tartrite of antimony.

Of tartrite of antimony.

Tartrite of antimony is itself one of the most efficient medicines we possess, and although much more frequently used now than heretofore, it deserves to be more commonly resorted to, and we are under obligations to Mr. Jeffrays for impressing this fact.

Subacute.

The subacute inflammations of the testis may be confounded without sufficient attention with sarcocele, or specific tumors, whether schirrhus, medullary sarcoma, or hydatids ; indeed, in some cases the character is so indolent as to leave the matter doubtful unless very accurate diagnosis be employed.

They are often complicated with effusion of fluid into the tunica vaginalis, curable in most instances together with the original disease, and constituting a description of hydrocele, which it may be well not to confound with that arising from diseased action of the tunica vaginalis.

Diagnosis.

In investigating the nature of these diseases, the principal indications are given by the following points: 1*st*, the pre-existence of gonorrhœa, or 2*nd*, the urethra being actually diseased ; 3*rd*, the digestive organs being sound or unsound; 4*th*, the diathesis being scrofulous, or the patient having suffered from venereal poison*; 5*th*, the progress of the disease being uniform or variable. The treatment must be regulated according to the probable nature of the cause.

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* I use the term "venereal" in a comprehensive sense, not meaning thereby to express syphilis only.

Remarks on the venereal inflammation of the testis, and the use of mercury in diseases of this gland.

The testicle is rarely diseased from the effects of true syphilitic poison, in a healthy constitution; but this more frequently arises from the irregular forms of the disease*, occurring in scrofulous constitutions, or where mercury has been injuriously employed; there are generally accompanying symptoms, either in the bones or skin, but very irregular in their character.

If there is strength of constitution, a judicious employment of mercury combined with sarsaparilla, and proper diet, will generally succeed; if it has been much shattered, probably it will not be safe to carry the use of that medicine beyond simple friction on the part.

Mercury cures many subacute inflammations of the testis which are not venereal; and the nature of the disease has, thus, often been unfairly inferred from the result of the treatment. In fact, this appears to be one of the structures (and perhaps glands generally may be included) in which mercury has a very powerful effect in controlling the actions and removing the effects of inflammation. The iris exhibits another remarkable example.

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* *Vide*, Mr. Abernethy, *Surg. Obs.*, vol. i. p. 169.

It is a singular thing that in the same person, labouring under disease of the testicles from a constitutional cause, we shall frequently find one much enlarged while the other shall be as much diminished—wasted perhaps to a bud, and this may be as hard, and more painful, than the other. This fact resembles one which belongs to the history of diseases of the liver; namely, that sometimes it enlarges, sometimes diminishes, from disease: the remarkable circumstance in the present instance is, that both processes should occur in the same individual at the same time.

THIRD ORDER.

Inflammation affecting common or external Parts.

Characters. The inflammations belonging to this Order produce less constitutional sympathy, and require less active depletion than the two preceding. The last Genus affords some exception to the former remark, from circumstances which will be explained in the proper place.

GENUS I. *Char.* Disposition either to resolution or to chronic induration.

Species a. Mumps.

b. Some inflammations of the mammæ and other glands.

Consequences which result as to treatment, from understanding their natural mode of termination; and observations on the use of cold or warm applications.

The characters which have been assigned to these inflammations ought to have a material influence on our treatment; for, as we have nothing to apprehend from suppuration, we may employ warm fomentations, poultices, and even stimuli, without reserve, and, as we have chiefly to guard against their becoming chronic, these are often highly useful.

It is one principal object of this essay to ground the plan of treatment on the peculiar disposition of the inflammation we have to manage; and one of the most important features in this is, its tendency to one mode of termination rather than another.

"A criterion," says Dr. Kirkland (vol. i. p. 317), "ought to have been fixed, when to attempt discussion, and when to let it alone." I believe no better can be found than the natural disposition of the inflammation itself; for, if that is decidedly to suppuration, no attempt, probably, to resolve it will be successful, or, if so, advantageous, with a very few exceptions; for such a disposition is generally calculated to relieve the constitution.

When the disposition admits either of resolution or suppuration, then of course the former is to be preferred, but the means of accomplishing this object are by no means the same in all cases; thus, where there is but little tendency to suppuration, we may employ warm applications without reserve; whereas, if there is much, they must often be avoided; while, on the other hand, they are particularly proper where there is *no* disposition to resolve. There is an avowed difference of opinion with respect to the superiority of warm or cold applications, and some surgeons are almost exclusively addicted to the use of the one or the other; but, where there is not such a prejudice existing, it has been confessed that the preference of the one or the other is very often founded rather on empirical than on rational motives. If the principles above stated are true, they may contribute to guide our judgment in this important matter.

There are two points, however, which must be borne in mind: 1*st*, that an inflammation which in the beginning might easily have been brought to resolve, as phlegmon, shall after a time tend wholly to suppuration, when any attempt to disperse it will prove injurious; 2*nd*, that the peculiarities of some constitutions forbid the use of actual cold, which compels us therefore to employ evaporating applications in preference. Upon the whole, it may be stated of direct cold, that it is more frequently useful in inflammations which result from external violence; and in the spontaneous, it is more commonly advantageous in those whose character is very acute than in others.

It is quite unnecessary for me to enter into any description of mumps or its treatment.

Different species of inflammation of the mamma.

With regard to inflammations of the mamma, we may have either simple phlegmon, or mammary abscess, which, as it depends upon a peculiarity of state and function, ought to stand alone. Mr. Hey also describes a deep-seated abscess to which this gland is liable, of rather a chronic character, and is the same, perhaps, as that which Dr. Kirkland has described as the encysted: Dr. K. also describes two others, under the titles of chronic and lymphatic. Dr. Kirkland wrote from much experience, and therefore it is hazardous to venture any opinion against his; but I cannot help thinking that these abscesses are the result, (though rarely), of a disease which is sufficiently common,—namely, inflammation of the glandular part of the breast, from disorder in the digestive organs, uterine system, or both, most frequently occurring in unmarried females, and having *very little* tendency to suppuration.

The subacute.

This kind of inflammation is of a subacute character, but occasionally gives severe pain, increasing before the periods of an irregular menstruation, or from any additional disturbance of the digestive organs; it may continue for a great length of time, and very rarely indeed terminates in suppuration or in schirrhus, as far as I have known.

Leeches, and tepid saturnine lotions, with a small quantity of the sp. lavendulæ, when in an active stage; and afterwards frictions, with a weak lini-ment of camphorated oil and ungt. hydrarg., and the strictest attention to repair the error in the digestive functions and uterus, seem to be the means best calculated to remove or relieve this.

I was for some time in doubt whether the inflammations of the mamma should be considered in the same Order as those of the testicle or not: but the arguments preponderate against it. The mamma does not bear the same relation to the system of the female which the testis does to the male; the latter is a primary organ, and its existence, healthy state, or removal, produce a leading effect upon the entire system of the individual; whereas the mamma is an auxiliary organ itself dependant upon the existence of the ovaries, its removal affects the system but slightly, and its diseases do not produce a greater influence than similar diseases would in many other parts. As a gland, too, it differs much in structure and function from the testis.

Subacute inflammations of lymphatic glands.

Of these subacute inflammatory swellings of the glands I know no account which is at all satisfactory, but that which Mr. Abernethy has given. To the foregoing may be added somewhat similar affections of lymphatic glands, not scrofulous.

Those which it has occurred to me to meet with most frequently, have been in the groin;—sometimes the inguinal, sometimes the external iliac, being the seat of the disease.

Causes, character, and treatment.

These occur in young men generally, of irritable, susceptible, and rather delicate habits; under the influence of constitutional disorder, by whatever cause induced, but generally from late and irregular hours, the use of too much fermented liquor and stimulating food, combined perhaps with over exertion. To their production an irritable state of the urethra often contributes; and it may be always justly suspected, as it frequently suffices of itself to produce them. I am well satisfied, however, that they often occur without it.

In the first attack there is a good deal of pain, tenderness and stiffness about the part; with common care, however, these subside in a few weeks, or even days, and the swelling continues either in an indolent state, or gradually advances to suppuration, or slowly disperses.

If suppuration takes place, the pus has not the sero-purulent characters of scrofula,—neither is the sore reluctant to heal, as in that state of the system.

A late author has stated, that abscess commonly forms, and that it is desirable to encourage this termination, as a cure seldom takes place without; I have seen several instances of the contrary.

There is commonly a very marked degree of disturbance of the digestive organs, forming a more prominent feature than is to be observed in many other diseases.

The means chiefly to be relied on in the treatment are:—regular and light meals at regular and early hours; avoiding fermented liquors, or perhaps taking a glass of white wine in a tumbler of soda-water at dinner; going to a pure dry air, and using as much exercise in an open carriage or on horseback, as may be taken without decided prejudice to the local disease, combined with the use of medicines which will excite secretions from the alimentary system generally, and produce a regular discharge from the bowels; and to the part a tepid lotion with the sugar of lead, or the liq. ammon. acet. diluted, or tepid poultices, and leeches at the commencement, are the best applications; and when the actions have become more feeble, a gum-plaster, the emp. hyd. cum conio, or the sea-water poultice, will contribute to disperse the swelling.

GENUS II. *Char.* Disposition to resolve, or to suppurate.
Subgenus a. In which the disposition to resolve is considerable.
Species *Phlegmon.* { In cellular membrane.
In glands. }

Having elsewhere stated the inconvenience which is likely to arise from applying the terms phlegmon and phlegmonous so indiscriminately as it is now usual to do, I should be disposed to restrict the term phlegmon to inflammation possessing the following characters:

Definition.

Tumor circumscribed, commencing in lymphatic glands or cellular membrane, attended with heat and pain, originating from constitutional disorder, and accompanied by pyrexia well marked, but not intense.

Principles of treatment.

It will admit of resolution, but having also a tendency to suppurate, we should seek to resolve it, if resolution be desirable, by such means as will not be liable to encourage the latter termination instead; thus leeches and evaporating lotions, or poultices, will be preferable to warm fomentations and poultices. When, however, suppuration must occur from the inflammation having passed a certain stage, this process should be encouraged, and in many cases it is desirable to do so from the beginning.

Subgenus b. The disposition to suppurate predominating.

Species 1*st.* Furunculus mitis.
2*nd.* Paronychia mitis.
3*rd.* Abscess juxta anum } In young persons.
4*th.* . . . . . urethram }

Reasons for separating the mild and severe species of inflammation bearing the same name.

I have done a bold thing in venturing to separate into different genera diseases of the same name, situated in similar parts, and nearly allied to each other. I do not apprehend, however, that the marking the distinctions more strongly than has hitherto been done between the mild and severe species of inflammations in other respects similar, will be practically attended with any inconvenience; but I believe much the contrary, and considerable advantage may perhaps be derived from considering more attentively the causes upon which the differences in their nature depend.

The furunculus mitis is the milder kind of boil, which is not large, and in which the slough is inconsiderable, if any forms; and, unless there be many, there is little pyrexia.

The paronychia mitis is that species of whitlow which occurs under or by the side of the nail, in the last phalanx of the fingers.

The abscess juxta anum is the phyma of the antients, and is particularly apt to occur in consumptive patients, and relieves disease of the lungs, or abdominal viscera, in a very remarkable manner.

The abscess juxta urethram is less commonly met with in young persons than in those more advanced in life.

If left to themselves, these various inflammations would, in a great majority of instances, go on to suppurate; it is their natural disposition, nor does it appear desirable to attempt to interfere with this, excepting in the last species, and in the abscess juxta anum, where the constitution is pretty sound; for this may occur from gross living in young people, and without the necessary concurrence of any serious disorder of the viscera, and as it may probably, if it suppurates, lead to fistula, it will be desirable to resolve it; nevertheless, it will hardly, if ever, be safe to employ cold, and leeches and tepid poultices will constitute the best local remedies, combined with proper medical treatment.

GENUS III. *Char.* Disposition to unhealthy suppuration and mortification of cellular membrane or glands.

Species. 1*st.* Furunculus gravis.
2*d.* Carbunculous abscesses.
- *a.* Angina externa.
- *b.* Abscess juxta anum }
- *c.* . . . . . . urethram } In advanced life.
- *d.* Anthrax on the penis.

3*d.* True carbuncle.
4*th.* Pestilential bubo.

The peculiar characteristic of inflammations of this genus is, their strong and almost irresistible disposition to terminate in the sloughing process more or less, and in the pus produced being of the worst description and most irritating qualities.

Seat in cellular membrane or lymphatic glands.

The original seat of all (the true carbuncle probably forming no exception) is in the cellular membrane or lymphatic glands beneath the skin, although the inflammation is communicated to it more or less speedily.

Hence some of the peculiar characters of these inflammations.

Cellular membrane much more readily perishes under unfriendly inflammation than skin; while, on the other hand, it has a much greater power of limiting inflammation by the adhesive process, and hence the limited character and the strong disposition to form slough underneath may be explained, from that integument not being primarily affected.

There is a considerable similarity in many respects between this inflammation and the worst kinds of erysipelas; but there is a leading distinction arising from the skin being secondarily affected in the former, and from the disposition to limit it in consequence.

Mr. Hunter describes the carbuncle as beginning in the skin almost like a pimple, and going deeper with a broad base under the skin in the cellular membrane.—Vol. i. p. 481. I believe even in this, the true carbuncle, that the *principal* affection is in the cellular membrane beneath the skin; and that the superficial pimple is rather sympathetic, if I may use the term, of the disease below, as in boil, in which "there is commonly a whitish or livid pustule, and exquisitely sensible to the touch, and immediately beneath this is the seat of the abscess*."

Sympathetic affection serious.

As the sympathetic affection of the constitution always bears a proportion to the risk of death or serious mischief, and as this is always considerable where there is mortification to any extent, it is not to be wondered at that in such cases as these it is very considerable.

They occur from the immediate effects of some local injurious cause, in most instances in persons who have lived freely, grossly, and irregularly, and whose digestive organs are particularly disordered and generally loaded, and whose whole body and circulating fluids are in truth an unhealthy composition.

Its nature.

The pyrexia, or degree of vascular re-action, will greatly depend upon the remaining powers of the constitution, and as the subjects are often people of originally strong stamina, it is often very considerable; but there is an invariable and strong tendency in all cases to sinking of the nervous powers, which, when sloughs are formed, often takes place very suddenly, and to a great degree. A hurried and anxious, and depressed state of the nervous system are manifested by the tremors, the tendency to low delirium, and the hurried and anxious countenance. The disordered state of the digestive organs is evinced by the furred and bilious tongue, the nausea, head-ach, and foul discharges.

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* Pearson's *Principles*, p. 71.

General principles of Treatment.

The object of medical treatment is to unload the bowels, which generally contain a large quantity of collected fæces, and at the same time procure secretions from the liver; a dose of calomel, followed by a mixture containing the sulphate of magnesia or tartrate of potash, senna in infusion and tincture, and jalap, with a little tartrite of antimony, if the nausea does not forbid it, perhaps afford the best mode of acting upon the bowels with these views; and indeed, if there is any reason to believe that the stomach is loaded, an emetic is very useful. In the subsequent stages, blue pill, followed by rhubarb and senna, and tartrate of potash, form the best laxative, as I believe. The employment of purgative medicines suited to the case is by no means a light matter; in many instances it forms by far the most important part of the treatment, and if, by injudicious conduct, we leave accumulated fæces in the bowels, or fail to excite the secretions from the liver, or if we irritate them too much, and more particularly, if we bring on purging of watry stools, we shall do much harm where we might do much good. The compound extract of colocynth with calomel is often a good medicine in the beginning.

If there is much strength of action in the system, the saline draughts in effervescence will be useful; if not, the liq. ammon. acetat., with camphor mixture and conf. aromat., with small doses of tinct. opii camphorat., or Dover's powder, at night.

In proportion to the want of power, it becomes our business to support the patient; for if we can keep him up till the sloughs form and separate, he will do well. *According, therefore, to the necessity,* it will be our duty to supply him with such articles of drink or food as may to us appear most advantageous, and in the advanced stages it often becomes necessary to push this plan pretty far; and indeed in all instances it is important to remember, that as these inflammations *are of the limited kind,* there will be less danger in exciting the vascular system than if they were otherwise.

But it is of still more consequence to employ suitable local treatment, for upon this the life or death of the patient will generally depend. It is rarely possible to prevent these abscesses from going into suppuration, and therefore it should be our object to promote the process by warm fomentations, and poultices, which in some cases it is serviceable to make with stimulating fluids; for this kind of inflammation is attended with great want of nervous energy in the part, and for this reason, evaporating lotions or poultices would be highly improper.

It is not only their character to form slough, but pus of the worst description; healthy pus simply excites a disposition in the part to discharge it as a foreign body; but unhealthy produces excessive irritation, and acts like a poison lowering its powers. There is, as explained p. 78, a strong exertion made to wall in matter so injurious, and this, contrary to the more general tendency, extends to the surface, and hence it is longer confined, a passage being only effected after a long time by ulceration or mortification of the skin if the patient lives.

The danger in general arises from the confinement of the sloughs and foul matter after they are formed; a leading point in the treatment then is,—to evacuate these as soon as possible, and although these abscesses, with the exception of boil, do not point like phlegmons; yet the peculiar feel and appearance, and the phlyctenæ which often form, will afford pretty sure indications of its existence.

FURUNCULUS GRAVIS.—Boils most evidently depend upon a disordered state of the constitution; but if the person be young and robust, the kind will be mild; if feeble and cachectic, it will be of this sort, and be attended with sloughing.

Two kinds,—acute and chronic, or rather subacute.

The character of boils, however, which possess this disposition considerably differs; we may observe in general, either that they form conically, with much active, but sublivid, inflammation of the skin, and perhaps a pustule on the surface, and open up pretty widely, so as to discharge sooner or later a large slough,—a form of the disease which is exquisitely painful: or it is much slower in its progress, more dusky in its colour, flatter in its form, attended with little pain, surrounded extensively with induration, and discharging imperfectly, by a number of perforations like pin-holes, a thin, crude, but inoffensive, matter; and, if the skin be closely examined, this dusky, brawny integument will be found to have the layers of the chorion sodden in pus.

The seat of boils seems to be chiefly on the outer part of the limbs and trunk, where the vital powers of the integuments are less active, and sensibility less acute than elsewhere, as on the outside of the thighs, nates, *&c.*; and is often determined by some cause of irritation, as on the under part of the seat from riding; in the cheek, not unfrequently from the presence of a decayed tooth.

Treatment of the acute form.

In the acute form, a principal object is to unload the bowels, which is advantageously done by calomel with or without colocynth, followed by the common purging mixture of salts and senna, and by mild and sparing diet; but in those of a more indolent and chronic character, or during the granulating stages of the acute, a nutritious diet with wine or porter, if there is much debility, is proper; and sarsaparilla, with the compound calomel pill; bark and soda, or Rochelle salts; still more, sea air and sea-bathing will be very useful.

Of the subacute.

The subacute species is connected with a decidedly cachectic state of constitution, and is often attended with a good deal of permanent feverish excitement; is of considerable duration, and requires great attention to the state of the health generally.

When the more acute boils are open, they are often exceedingly painful and irritable; in which case, if the common soothing applications fail, the old epithems are sometimes useful.

Local treatment of subacute or chronic boil.

In the chronic boil, if there is much surrounding hardness, hot fomentations and poultices of linseed or oat-meal, made with decoction of onions, or boiled onions, or with the root of the white lily, are the best applications: if there is not, or when this hardness subsides, it is more convenient and as useful to apply some stimulating plaster with apertures (if they are open) as the emp. gummi, *&c.*, or the sticky resinous salves, as the old ungt. suppurans, and indeed the vulgar remedy of cobbler's wax is not a contemptible one; and I must take this opportunity of meeting the ridicule which some may be disposed to bestow on such commendations, by stating my belief, that we have simplified our external remedies rather too much; and that, as there are many substances which have a peculiar influence on *ulcers*, so there are some also which are particularly adapted to the *diseased sensibilities* of certain *inflammations*.

With regard to opening boils, if it be done early before the slough is produced; *i. e.*, if they are fairly cut through, it will often cure them at once; but in the large malignant boil, it is seldom wise to interfere at all with the processes of nature, or at best only to anticipate that of opening the skin, when there is nothing more to be done. In the chronic, or rather subacute, boil, it may be useful to score freely through it; for the skin has very little disposition to give sufficient vent to the matters beneath by ulceration; but when it occurs in the face, it will be better to content ourselves with making punctures in preference, where they may be required, by which a little time will be lost, but a scar avoided; however, there will always be reason to fear, that the skin may be left more or less puckered and rigid, from the mischief in the subjacent cellular membrane.

CARBUNCLE.—In the true carbuncle, as in the boil, although the chief seat of the disease is in the cellular membrane, yet the skin is very early affected; whereas in those abscesses which I have presently to describe, this is not the case. True carbuncle indeed seems to be most nearly allied to boil, and I believe it is not uncommon for those who have had boils in earlier life to suffer from carbuncle in old age.

Of carbuncles also, as of sloughy boils, there seem to be two species; one highly acute, the other by comparison indolent.

The disorder of the constitution is that already mentioned as belonging to the genus, in an aggravated degree.

True carbuncle generally appears on the back, and is described as a deeply-seated, hard, immoveable, circumscribed tumor, attended with an intensely-painful sense of burning in the part, and considerable discoloration of the skin, with small vesicles or vesications. It is little elevated above the surface.

In the progress, the skin sloughs and ulcerates partially, and then the subjacent sloughs may be discharged; but this process is much more tardy in the skin than in the cellular membrane, and hence the urgent necessity of early and free incisions.

Some distinguishing title wanted for the sloughy abscesses allied to carbuncle.

Anthrax and carbuncle literally meaning the same thing, and being considered as synonymous terms by most authors, we are compelled to admit them as such: yet it is a pity that there is not some appropriate designation for the kind of abscesses we have next to mention; namely, those which form near the anus, urethra, on the penis, or on the neck, *&c.*, with strong disposition to sphacelate. They differ from carbuncle more in degree than in nature; they also differ in the cause, which is partly local, and in the seat. Shall we call the former true carbuncle; and these, carbunculous abscesses, or anthrax, affixing an arbitrary distinction? To the French term, "phlegmon gangréneux," I object; because there is a wide difference between them and phlegmons: and to the general title of gangrenous abscesses I object, because there are gangrenous abscesses of a different nature, *e. g.*, erysipelatous.

Points in which they differ from carbuncle.

These abscesses differ, certainly, from true carbuncle. The skin is not so early affected; it rarely becomes so dark; the tumor is not so flat; there is not so large a proportion of slough. They occur in parts more disposed to vigorous action than the back, and in persons of a different description,—often in females; and, although I believe they will rarely, if ever, occur in those whose habits have been temperate, still they are not so precisely the diseases of the rich as true carbuncle.

ANGINA EXTERNA.—The first I shall mention occurs in the neck, of which it has happened to me to see several instances.

Situation, character, symptoms, and progress.

The patient (perhaps a female) of unhealthy, and generally full and gross habit, has a swelling deep-seated in the side of the neck, towards the angle of the jaw, causing a great degree of pain in that side of the head, from its effects upon the nerves of the part most probably, and accompanied with much pyrexia.

There is loading of the cellular membrane similar to that which we observe in erysipelas phlegmonodes, but well limited, firmer, and more prominent. This takes place to a great degree, and the result is that the patient is scarcely able to swallow fluids, breathes with great difficulty, and cannot sleep from the impending suffocation. After a time, the skin adheres and inflames, and thickens as it inflames, but does not point, or, for a long time, shew any symptoms of pointing, or giving way by slough or ulceration: meanwhile, sloughs and noisome pus have formed underneath, and do great mischief. It sometimes happens that these abscesses, if not opened, will burst into the throat.

Particular necessity for evacuating the matter.

There is great danger of their destroying life, not only from the direct influence of such injurious matters, when confined, but by suffocation, if proper relief is not afforded; and it often is of the greatest importance to make a free and deep incision to divide the thickened integuments, and evacuate the matter, though, from the uncertainty of its situation, and the nature of the parts, the surgeon would be unwilling to do so if the necessity were not paramount; but upon his conduct in this respect the life of the patient will mainly depend. A person accustomed to these collections of foul matter beneath thickened integuments, will detect its existence by the peculiar feel of a doughy yielding matter under the tense elastic skin.

The only author who has particularly mentioned this form of inflammation, as far as I know, is Dr. Kirkland, who has given it the title of angina externa. His description is very brief.—He gives one case. Others speak of suppuration of the parotids. I am apt to believe it is very rare; but possibly abscesses of this kind may have been taken for it.

Phlegmon will occur, and indeed is apt to occur in this situation as well as elsewhere; and that is phlegmon in one constitution which becomes the foul abscess I have now described in another.

Abscess juxta anum.—Abscesses occur in persons of similar habits and constitution, in advanced life, in the neighbourhood of the rectum, and are very similar to the preceding in their nature and progress; but in the neck they may occur without any immediate cause, although a draft of cold air very often acts as such; but in the rectum, the irritation of hardened fæces, or something else wrong about that bowel, very commonly proves the immediate cause.

Different kinds of abscesses which form near the rectum.

Mr. Pott describes four kinds of inflammation as liable to occur in this situation: 1*st*, The phyma, or simple phlegmon; 2*nd*, an inflammation which bears much the character of boil*; 3*rd*, another kind, which appears to be œdematous erysipelas†; and, 4*thly*, the abscess to which I now allude. I have often seen the 1*st*, 2*nd*, and 4*th*; the 3*rd* is, I believe, comparatively rare.

With respect to the last, Mr. Pott thus expresses himself: " Our ancestors," says he, " have thought fit to call it in some a carbuncle, and in others by other names; but it is (wherever seated) really and truly, a gangrene of the adipose and cellular membrane: it commonly implies great degeneracy of habit, and commonly ends ill."—Vol. iii. p. 59.

To the prognosis, however great the authority, I should, from my own observation, object; for the greater number of the cases I have seen have done well.

The treatment is to be conducted upon the principles stated, p. 180; but there are many circumstances arising from the nature and connexions of the part, of the greatest consequence, and which should be fully understood, but which, in the scheme of the present work, it would not be possible to do justice to.

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* Vol. iii. p. 52.

† Vol. iii. p. 50.

Immediate cause.

ABSCESS JUXTA URETHRAM.—The abscesses which form in the perinæum, by the side of the urethra, are sometimes the result of effusion of urine, from rupture or ulceration of that canal; but more frequently they take place, as gum-boils do, from the influence of neighbouring irritation; but in these cases it is generally owing to the existence of such a state of constitution as has been described as belonging to this Genus.

Appearance, progress, and treatment.

Inflammation and abscess will occur, in the young and healthy, in the neighbourhood of the urethra, where there is stricture, from the imprudent use of the bougie, or any other irritating cause; but such generally subside again if proper measures be pursued.

The abscesses to which I now allude, form generally around the bulb, and often in the cellular membrane, above the fascia perinæi. In the commencement they cause no great suffering or inconvenience, but soon great disturbance of the system takes place, great pain and distress about the part; and the tumor, which was at first indolent and hardly affected the surface, becomes very tender and painful, and the skin inflames and thickens exceedingly: from the extension of the inflammatory disposition to the scrotum, the loose cellular membrane of that part soon loads enormously, so as to give the idea of urine having escaped. If this state continues, either that mischief will happen, or the patient may sink from the effects of the confinement of the sloughs and matter, and there are no cases where ample and early incisions are more strongly called for. The general principles of treatment need not be repeated.

True urinary abscesses may occur in the most healthy constitutions if the urethra is ruptured. They lead to consequences nearly similar, from the sloughs and foul suppuration to which the extravasation of urine gives rise; but they still more urgently call for immediate incisions.

Mr. Evans* describes, under the title of anthrax, those foul sloughy abscesses under the integuments of the penis, which occur in young men, and recommends bleeding for them. These he attributes to the state of constitution, and that a state of the inflammatory kind. I believe that sloughing, occurring in such constitutions, does require bleeding; and also that there may be abscesses in the neighbourhood of the rectum or urethra, occurring in men in the prime, or middle, of life, which will also be benefited by bleeding, although they tend to slough; but in advanced life and gross habits, the case is different.

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* *On Ulceration of the Genital Organs.*

Abscesses in parts of particular structure I must leave unclassed, as they very often, if not generally, arise from circumstances belonging to their functions; such are abscesses of the lachrymal sac. antrum,—some of those of the mammæ, *&c.*

CLASS SECOND.

Char. The disposition to spread, from failure of the adhesive process, owing to a faulty state of the constitution.

The disposition to limit not entirely absent, but ineffectual.

It is not to be understood that I have any intention of asserting, that the disposition to limit is entirely absent in this class of inflammations; on the contrary, there appears to be a struggle in the part and the general system, arising from the endeavour to effect that which they are either totally, or for a long time, incapable of performing.

Distinction to be made between the spreading of inflammation from the nature of the surface merely, and from the state of the constitution, determining the inflammation to a surface.

The disposition to spread may exclusively depend upon the nature of the part affected,—as a surface: thus, we may have peritoneal inflammation in a constitution decidedly capable of limiting inflammation elsewhere; but in such cases the origin of such inflammation may generally be traced to cold, or injury of some kind, or metastasis, and it will not belong to this Class.

When inflammation arises on surfaces, purely from a disordered state of constitution, that state will be such as is now alluded to, and marked in common by deficiency of nervous energy, generally owing to marked error in the digestive organs, or the result of intemperate habits of living,—the influence of morbid poison, or morbid air,—or the united effects of several of these.

Instead of believing that the peculiar symptoms and state which are remarkable in this Class of inflammations, are referable to the circumstance of its being such and such a surface which is inflamed, I am apt to think, that, in this state of constitution, there is a disposition to determine the inflammation *to surfaces.* But I will freely allow, that a surface being inflamed, it will (as is very usual in the animal economy) itself become a cause, in its turn, increasing the spreading disposition.

Products of inflammations of this Class.

Let these inflammations be situated where they will, when they produce effusion, this is either of a serous nature,—whether it be merely dark and unhealthy serum alone, or mixed with flocculi of lymph;—or of pus, of a thin sanious, or brown, or green, but always unhealthy character; and very often they occasion sloughs. If they affect the skin, it has a strong disposition to separate in vesicles or phlyctenæ; if the cellular membrane, to slough; if serous membranes, to pour out turbid serum mixed with lymph; if mucous membranes, in many cases to ulcerate or slough.

It is not meant to affirm, that organizable lymph is not sometimes effused in these cases, and adhesions formed; it is by the supervention of this process that the disease is arrested in general; neither is it to be denied that in the first Class the inflammation may terminate in the effusion of serous fluids, (as happens in the peritoneal cavity sometimes, of a reddish nature mixed with flocculi of lymph,) or in sphacelus; but, then, this is only in cases of extreme violence, and may generally be prevented by proper treatment; whereas, it is the natural disposition, in these now alluded to, to produce such results.

ORDER FIRST.

Affecting Vital Organs.

Leading differences between inflammations of the vital organs of the First Class and this.

I have little more to say on the subject of vital organs than has been already stated (p. 145.); but I may mention, that in inflammations which belong to this Order, the actions are, in general, less intense than in the 1*st* Order of the 1*st* Class; the vascular excitement less; and the pain often so little, that its degree gives no adequate idea of the mischief which exists, and indeed sometimes has passed unobserved, though this symptom, more than any other, announces the existence of the disease.

It is now well established, that in all inflammations of vital organs, whatever may be the type, bleeding is the remedy chiefly to be depended upon; and that the old idea of its disposing the patient to that state of debility and malignity which, if it be neglected, will ensue, has been unfounded and mischievous. It may, however, be observed, that this is only certainly true when the practice has been adopted in time; for, when effusion has commenced, it is much to be doubted whether bleeding may not, and does not, often do more harm than good.

Should they be classed with inflammations of vital organs, or constitute a separate *Order?*

INFLAMMATIONS OF VESSELS.—Vessels can hardly be considered as vital organs; yet, when inflamed, there is so strong a disposition in that inflammation to extend to the heart (excepting in the case of absorbents), that a vital organ is generally, if not always, compromised; but it still remains a question, whether it would be right to include them in the 1*st* Order, or establish an Order apart for them.

Ought they to be included in this *Class?*

Again; with respect to the Class, some doubt may arise, whether they should be included in the *first*, or in this; for, undoubtedly, there is much disposition to form adhesion, with a strong tendency to spread; and, with respect to the previous state of constitution, it has been asserted by an authority, not less than Mr. Hunter, that in the case of veins it is often healthy. This, however, I should doubt; for the very fact of venesection, when this has been the source, implies some constitutional disorder; and, although it is very true that inflammation rarely ensues from this cause (excepting where the wound of the vein has been badly united), yet it very often does not so, although the orifice festers; indeed, in a very large proportion. Again; the other cases in which the vein inflames, are those in which the system has been long irritated by a sloughing stump, compound fracture, *&c.*; and it rarely takes place in a healthy state of any wound.

The most frequent.

INFLAMMATION OF ABSORBENTS.—It is much more frequent than inflammation in any other division of the vascular system. It generally arises from the irritation of a sore, in a constitution predisposed to it, for there are no sores which do not engage absorbents, yet this kind of inflammation is not a very common occurrence, and, indeed, seldom happens, excepting in the extremities, particularly the lower.

Characters.

The inflammation runs along these vessels, and, being communicated to the surrounding cellular membrane, the skin inflames over them, and the progress is marked by streaks running along the limb with much rapidity, both upwards and downwards. The great facility with which it is communicated to the surrounding parts, perhaps arises from the extreme tenuity of these vessels. In the immediate vicinity, lymph is effused, and gives a feeling of hardness, as of a chord.

The inflammation spreads over the skin, in the form of erysipelas, for a considerable distance around the original seat; and beyond this the streaks extend until they meet with lymphatic glands, where they usually stop.

In the lower extremities, this inflammation is very severe—but I propose to speak of it hereafter. In the upper extremities, it commonly does well after a few days, but abscesses frequently form in the course of the absorbents and in the lymphatic glands. Severe cases occasionally occur, in which life is endangered, and sphacelus and extensive suppuration may take place.

The affection of the constitution is generally marked by great irritation of the nervous system; and, if the case be severe, there is much anxiety, hurried pulse and respiration, and disposition to vomit.

Treatment. With regard to treatment,—a bread-and-water poultice, made either with or without the acetate of lead, appears to be the best application to the part, and a weak spirituous lotion, to the limb above, seems to possess some power in checking its progress. If the heat of the part is such as to be uneasy to the patient, this may be applied cold, —if not, warm, and the limb enveloped in soft flannel.

The general treatment is by mild laxatives, and saline draughts in effervescence; and bleeding is sometimes required in the more severe cases.

We were left almost without any account of this form of inflammation, till Mr. Abernethy published his *Remarks on the ill Consequences sometimes succeeding to Venesection,* in which a valuable account will be found of this disease.

There is another variety, which certainly differs in some respects, and in which the Profession ought to feel a particular interest, but which has not, as yet, received any distinct notice. I mean the inflammation which is produced by the absorption of the matter of dead bodies. If dissection is the only road to certain knowledge, or rational opinion, in the practice of surgery and of medicine (and that it is so cannot be denied), it behoves those who are conscientiously busy in the pursuit, to take all care compatible with the acquisition of knowledge, to guard against an evil which has, of late years, proved very fatal in its consequences, and to learn what are its peculiarities, and what its best mode of treatment. For these reasons, it is much to be wished that some of the eminent surgeons who are at the head of large classes in the metropolis, would give the world the information they possess on this point. For my own part, what I have obtained, directly or indirectly, will not authorize me to enter upon it, although I feel a sufficiently strong interest in the matter, from having lately suffered in my own person from this cause. I believe, myself, that the differences between this and common inflammation of the absorbents, arise from the peculiar effects of the poison in lowering the nervous energy both, general and local; but whether this may justify, in any, or in what cases, the use of stimuli, is a question I must leave for better authority to decide. In my own case, the plan pursued was that recommended by Mr. Abernethy, in the essay above alluded to, and with the best effect; for, under his kind care, I soon got well.

INFLAMMATION OF VEINS.—As this kind of inflammation has been, comparatively speaking, little noticed in the works on inflammation, or surgery in general, it may, perhaps, be worth while to state the leading circumstances belonging to its history rather more in detail. What information we possess on the subject is of modern date, and is chiefly to be attributed to Mr. Hunter, Mr. Abernethy, Mr. Hodgson, and Mr. Travers.

The occurrence of inflammation of veins and its characters when it does take place, depend in a great degree upon their peculiarity of disposition under injury, and in the repair of injury.

A material difference exists between the structure and functions of arteries and veins, and also between the processes of inflammation which take place to repair injury; and upon the peculiar dispositions of the latter in this respect, depend the characters of venous inflammation, as Mr. Travers has explained.

Veins very seldom inflame.

Arteries are very prone to the adhesive inflammation, and with reluctance admit any other. Veins, on the contrary, will seldom set up the adhesive inflammation, at least from their lining membrane; if a vein be wounded, a clot is formed, and that clot is either organized from the cut edges, or the cut edges produce a membrane which repairs the mischief*; but if a vein be cut across, or tied, the adhesive process is not set up by its lining membrane to repair it, but the repair is effected by lymph effused by the sheath or the parts external to the vein, to which its divided edges adhere†. In fact, the lining membrane of these vessels very seldom inflames under any circumstances where veins are alone or principally concerned, as we may fairly conclude from the infinite proportion of their wounds to the known occurrence of inflammation in them; but we have Mr. Hunter's authority for believing that veins exposed to the influence of very unhealthy inflammation in parts by which they are surrounded, such as that consequent to compound fractures, in bad stumps, *&c.*, are liable to inflame and suppurate; Mr. Guthrie, whose observation has been unusually extensive, also mentions his having observed it in many cases of foul and sloughy stumps, in which he thinks it has accelerated death*; and Mr. Travers gives us instances, in which there is every reason to believe it proved fatal.

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* Travers *On Wounds and Ligatures of Veins.*

† Ibid.

But when they do so, inflame with great severity.

It is certain that veins, like other parts, do adhere, suppurate, ulcerate, and slough; but the occurrence of these processes is rare under circumstances in which we should expect them. Mr. Travers justly affirms that there is nothing contrary to the analogies which other textures present in the extreme severity of its inflammations, *when it does take place;* it is accordant with what may be observed of other surfaces, and this it will be remembered is (in part) one of vital importance.

Most commonly after venesection, in consequence of the ulcerative process taking place in the cut edges.

The cases which are most frequently met with, follow venesection, where the processes of union have been disturbed; nor is this to be wondered at, considering how little care is often taken of the wound—how much it is exposed to injury from motion; the wound, however, very frequently suppurates without any ill consequence arising; and when mischief does follow, it is much oftener inflammation of the absorbents, or erysipelas, than inflammation of the vein. When this occurs, it proceeds from the ulcerative process taking place in the cut edges of the vessel*.

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* *On Gunshot Wounds*, p. 99.

Often extend to the heart, proving fatal in other cases not beyond the limb, and these often recover.

When the lining of a vein inflames, it very often happens that it extends along the surface to the heart, in which case it is said, and I believe with reason, to prove invariably fatal;—in others, it does not extend beyond the limb probably, and these cases may recover. In the latter it is common for abscesses to form, and to break; the veins in the limb often suppurate in the former also.

Appearances in the limbs and vessels after death.

It appears that in the limb, a part of the track of the inflamed vein is occupied by pus—a part by lymph, which may either occlude the calibre of the vessel, or merely fur its sides; a part also is filled with coagulum of a dense and peculiar texture, not unlike that which is to be met with in aneurysmal sacs, or in veins obliterated, perhaps, from other causes. A barrier of lymph has usually been found at the termination of the vein of the limb in the primary trunk, and beyond that the surface has been seen simply red; the contiguous branches in the limb commonly participate. The coats of the veins themselves are much thickened where pus is not making its way through them.

The local symptoms which arise from inflammation of the vein greatly resemble those from in-

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* Travers, p. 258. *Surg. Essays*, Part. i.

Considerable resemblance between inflammation of veins and of absorbents.

flamed absorbents, and can in no other way be recognised sometimes, but by the chords taking the course of the veins, and being evidently continuous with them.

In the latter its progress arrested by lymphatic glands.

The progress of inflammation in the latter seems often to be arrested by lymphatic glands; in these no such barriers are to be found.

Constitutional symptoms.

The constitutional affection is of the same nature, as in the inflammation of absorbents, but in a very aggravated degree. When the inflammation has been propagated to the great vessels, there is remarkable anxiety and hurried respiration; *the rigors are uncommonly strong, and frequently recurring;* there is a great tendency to perspirations, which are very copious, partial, and often cold; the powers are depressed, and there is a peculiar sinking in the countenance; the pulse hurried, often small; the feet generally cold. These symptoms are apt to subside a little, and promise recovery; but they return, and the patient seems to approach to his end, from which state he is recovered by cordials; re-action then takes place, another and another relapse, and at length he dies in a state bearing a resemblance in some respects to typhus, but I am apt to believe the sensorium is very differently affected.

This description is intended to apply to the more severe form of the disease; for, from the cases he has himself seen, and those recorded by others, Mr. Travers concludes that it exists under two forms, of which he thus speaks:

"It appears, upon referring to the histories of these cases, that they have two modes of progress and termination; *viz.*, 1*st.* The formation of pus, and sometimes of abscesses in the vein, which, by ulceration of its sides, communicate with the cellular membrane, and point externally in the course of the vessel. 2*dly.* In continuous and pure adhesive inflammation* without any production of matter."

"There is a marked difference in the symptoms accompanying these two states; the first is a protracted irritation producing hectic, and ending in exhaustion; the second is a typhoid fever, such as we *often* see accompanying the severer forms of local injury, and which, speedily producing delirium, terminates within a few days." "The former cases, although always dangerous, are occasionally recovered; the latter, I imagine, never."

In the following case abscesses did form, although the man did not live long enough for them to break; it therefore gives reason to doubt not the general, but the invariable, accuracy of Mr. Travers's conclusions; but I give it chiefly because there are so few upon record, that each additional one will be valuable.

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* I should, with due deference, very much doubt this continuous inflammation being the pure adhesive.

Case. *Limperney*, a thin meagre-looking man, between fifty and sixty, fell upon his left side, broke his arm, and fractured the eighth and ninth ribs nearly half way between the angles and sternum: this was on the 26th December, 1817.

A bandage was applied, he was bled, and had a dose of salts. On the morning of the 27th, when I saw him, a considerable quantity of blood had been lost from the bandage slipping, besides that which my pupil had taken; as he complained of much pain, and his pulse were full, frequent, and strong, when I saw him in the evening, I ordered him to be bled again, and to have fifteen grains of nitre every six hours.

Dec. 28th. Better, but pulse 126; blood adhering to the side of the dish, crassamentum loose and no buff; find that he has previously been in bad health.

Dec. 29th. Better, pulse 84; full, soft, but jerking; good deal of cough.

Dec. 31st. Every thing quiet and going on well.

Jan. 2nd. Found him complaining of much pain in the side and breathing laboriously; much distressed in appearance; pulse full, strong, frequent; the cough very troublesome; the bandage I find occasionally slips from his chest; this is to be properly secured, a dose of salts given, and some Dover's powder to procure a quiet night. This day the arm was observed to be festered.

Jan. 3rd. The salts operated only once yesterday, the powder was by mistake given this morning; as there was much action in the pulse, and he was thirsty, took some blood from the jugular, and ordered liq. ant. tart., with liq. ammon. acetat.

Jan. 4th. Somewhat better after the bleeding, but passed a bad night, and this morning was attacked with a rigor so violent, that the pupil who attended him thought him *in articulo mortis*; from this he rallied, but there was so much sinking in his countenance and general depression, that I feared the effect of general bleeding, and directed that he should be cupped freely, have sinapisms to his feet, and weak wine-whey with liq. ant. tart. to drink.

Jan. 5th. The side relieved considerably by the cupping, and the pulse have subsided.

Upon making some inquiries about the arm in which he was bled, I think I ascertained the cause of the increase of the fever in a great measure, certainly of the rigor and great depression. With very little alteration of the natural appearance of the skin, it is enlarged to nearly double its usual size, and yet has lost its shape but very little; so that if I had not compared it with the other limb, I should not have been aware of the fact. There is a pale red line extending a little upwards and downwards.

The arm to be fomented and poulticed.

The antimonials have produced purging of fluid, pale stools; to have a little mixt. cretac.

Jan. 6th. Yesterday evening had a violent shivering fit, and was very ill all night. In the morning complaining of being *very ill and low;* warm over the whole body however; thirsty, tongue white, breathing rather laborious, but not complaining of his side; arm rather less swoln, but the cephalic and basilic veins felt like hard chords; pulse full and firm. A little wine with his gruel.

In the evening his countenance still more hollow and sunk; he wishes for more support, and says he feels the wine make him better. To have a light opiate.

The report is interrupted for two days.

Jan. 9th. Better; a small quantity of wine is continued with his gruel or sago, and he has an opiate at night; his bowels regulated. The pulse are rapid and frequent, full and soft.

Jan. 10th. Complains chiefly of the outside of the shoulder over the deltoid; although there is little discoloration at that part, on the fore arm there are two or three phlyctenæ, and there are patches of œdematous erysipelas.

There are rigors occasionally, and his aspect at times cadaverous, and irregular perspirations on the surface; but at intervals he has been much better.

Jan. 11th. Countenance almost hippocratic, respiration laborious, he solicited to have the bandage removed, he became worse last night.

He expressed a strong inclination for food, and as it appeared that no object could be gained by withholding it, I allowed him a little minced veal, and that wine, which had hitherto been given sparingly, should be administered more freely.

Jan. 12th. He rallied considerably, about midnight he was again taken worse.

Jan. 13th. His eyes glassy, and he had the countenance of death; his skin still warm and bathed in perspiration, his pulse more frequent and their strength considerable; it was probably the last effort of nature, for in the night he died.

There was always great anxiety and depression, but there has been no stupor as in typhus, and he was sensible to the last, with his eye glazed in death.

Examination, Jan. 15th.

Thorax.—The eighth and ninth ribs on the left side fractured. There was no union between the ends of the eighth, but they were contained in a little bag of pus of no unhealthy odour or appearance, and situated externally to the pleura. The inner side of this membrane was also inflamed for a very small space, and adhesions had formed to the pleura pulmonalis; further behind, and for about the space of the palm of the hand, a deposition of inflamed lymph between the pleuræ.

There was no effusion into either side of the thorax; the lungs appeared quite healthy on their anterior surface; the posterior as well, where there was not, as where there was inflammation of the pleura, of a deep red in consequence of the gravitation of a large quantity of blood. (I conclude it was not hepaticized, as this state is not mentioned.) There was also a very considerable quantity of frothy mucus contained in the bronchiæ.

The heart of the natural size, but rather flabby, and too fat; a patch of chronic inflammation on its covering pericardium, the aorta diseased, its calibre extremely large, the mitral valves thickened.

The right and left sinus venosi and the vena cava appeared redder than natural, and much more so than the ventricles; there was not, however, any alteration of surface; the pulmonary veins were cut off short.

ARM.—'The yena cephalica was principally diseased, (the orifice was in the med. ceph.); it was enlarged and hardened from the wrist to the shoulder, the surrounding cellular membrane and skin adhered to it from inflammation; its coats were greatly thickened, particularly in the fore arm; its calibre in many parts nearly obliterated, and from the axillary vein to the wrist, contained either pus or lymph. *At* the wrist the coats were of their natural thickness and structure, the lining very red; about two inches above, the calibre was filled up by red coagulable lymph, looking like that which I have seen in an obstructed vena cava, and like that which is found in aneurysms; it was firmly connected with the sides: at this part the vessel may be considered as obliterated by salutary inflammation. A little higher, the sides of the vein much thickened, the light not obliterated, and containing some pus, but a larger proportion of inflamed lymph, no red particles;—this continued to the upper arm, about the middle of which, the sides of the vessel were thinner, and the contents were fluid pus of a tolerably healthy appearance; this continued to the spot where the v. cephalica empties itself into the axillary, and at that point there was a little coagulum of blood, and a plug of lymph adhering to the sides of the vessel, and completely cutting off all communication with the trunk of the axillary, the lining of which, however, looked very red, but there was no alteration of surface.'

'The process of nature in this business seems to have been to throw out organizable lymph at two remote points, the intermediate trunk going through the processes of effusion of lymph, the secretion of pus, and as instanced at the upper part of the vein, the absorption of the *thickened* sides, while all communication with the general vascular system was cut off. The abrupt change from the state of suppuration to the state of adhesion at the point where the cephalic terminated in the axillary, was particularly worthy of note.'

'The lining of the vein, where lymph and pus evidently marked the existence of inflammation, was by no means so red as in the axillary and in the sinus venosi.'

The vena basilica shewed much less appearance of inflammation, contained no pus—only a little lymph. There was a vein going deep towards the venæ comites which contained pus, and two or three other branches, traced to a considerable distance, were similarly affected; others were merely red, and I had no opportunity of prosecuting the dissection further.

The abdomen presented no particular appearance, excepting that the bladder was much distended, of which, however, no complaint had been made before death.

The passages marked with inverted commas are copied verbatim from my case-book, and as this example occurred in 1817, before the publication of Mr. Travers's Essay, my attention was not influenced thereby. The coincidence, therefore, in the appearances here noticed, and those he has described, is satisfactory.

This case was unquestionably of a mixed nature, and some doubt must exist as to the share which the inflammation of the pleura, consequent on the fracture, bore in producing the symptoms, and how much depended upon the inflammation of the veins. From the history of the case, however, it should appear, that those produced by the former cause had subsided, and their renewal I am apt to impute to the latter; and for this among other reasons, that a fracture of the ribs to the extent here specified, rarely produces any symptoms of long-continued severity; and out of a very great number of cases which I have witnessed, none have occasioned death, or indeed hazarded life, excepting the fracture has been very extensive, the lungs wounded, or the patient has been aged.

With regard to the treatment, I by no means wish to say that it is exactly such as I should again employ in a similar case; but it will be remembered that the symptoms were also of a mixed and very perplexing character, and the previous state of ill health under which the man had laboured, rendered him an unfit subject for severe depletion under inflammation of a depressing character.

Remarks on treatment.

With respect to the treatment of these cases generally, it remains yet to be established; and as those who have written professedly on the subject have said little about it, it becomes me to express myself as I feel, very diffidently.

Where the inflammation does not pass beyond the limits of the arm, it seems to do well under a plan very similar to that which we should employ for inflamed absorbents. But there is always room to apprehend that it may exceed those limits, and therefore it seems to be our *principal* duty to endeavour to prevent this.

In the commencement this may be attempted, as Mr. Hunter has recommended, by applying compression; or, as Mr. Abernethy has suggested, by division; or, lastly, by tying the vein, as Mr. S. Cooper advises.

To the ligature the following objection arises: that as it does not divide the lining membranes, and as it does not produce adhesion, its irritation may act as a new or additional source of inflammation.

If the cephalic is the vein affected, there seems every reason for trying the effects of division, as it is superficially situated; but as the basilic soon loses itself in the sheath of the brachial artery, that operation is not altogether so simple, and perhaps is not to be recommended where there may be any reason to fear that the inflammation is passing towards the heart by other routes.

Before much swelling and tenderness have occurred, there appears to be every reason for trying compression; but this should be carried, I conceive, beyond the mere application of a compress to that vein which inflames first; for the chances are that it will extend to those which are contiguous; it should, therefore, be our conduct to put all these into a condition to adhere if they do so, and I should therefore bind the arm above for this purpose, and below for the additional motive of preventing the œdema, which the pressure above might occasion, and should then apply a spirituous lotion; but if much tension, swelling, and tenderness have occurred, soothing applications should, I conceive, be resorted to in preference.

With respect to general treatment, we have not much to hope from any plan we may employ, where the constitutional affection proceeds from the extension of the inflammation to the heart; nevertheless, some plan is to be adopted, and we are left to determine whether it is better to attempt to subdue it by very large depletion,—to arrest or change its character by other means,—or endeavour to support the patient through the processes which take place.

In the present state of our knowledge, the first promises most success; but it should be carried as far as may be possible, and if this, upon *fair trial*, fails, it may be worth while, in succeeding cases, to give bark, or other medicines, such as arsenic or mercury, with a view of trying to arrest the mischief, or of changing the character of the inflammation.

Mercury certainly produces an inflammatory state of the vascular system, and, therefore, would be likely to produce *an effect:* this effect might, very probably, be injurious, but, in cases so desperate, the experiment might be warrantable. Arsenic possesses a very remarkable power of controlling many diseased actions. The remarkable state of depression would rather forbid the employment of potent sedatives.

No inference, I conceive, can be deduced from the state of the pulse: it is no index of the degree of vital powers where there is a local source of irritation of the heart; and no practice can be, with safety, grounded upon that symptom alone.

With regard to the circulation of pus, on which so much stress has been laid, it appears to me very far from being proved. In those cases where pus has been found in the veins, a barrier of some kind or other has been noticed between it and the blood, and no appearance of blood has been observed mixed with the pus; whence we may infer, that no pus had mixed with the blood.—In truth, the circulation does not continue through veins containing pus. It is possible that matter may be secreted from their linings beyond the adhesions, and washed away immediately, but this must be conjecture.

INFLAMMATION OF ARTERIES.—There are no cases on record of an acute form of this disease taking place from wounds, as happens to veins, although cases enough occur where wounds of arteries long remain open in a most irritable condition; whence we may infer, that they are less prone to the extension of the inflammatory process. Subacute and chronic inflammations of arteries are by no means rare: inspections after death are continually offering us examples of the latter, and the former, are, I believe, of no infrequent occurrence. Perhaps the erethysm, from the use of mercury, is the most unequivocal example.

Reasons for believing that in a subacute degree this exists more frequently than is supposed.

I cannot but think that this subacute inflammation of arteries is more common than is supposed; and, when we meet with cases in which the circulation is remarkably disturbed,—the heat and secretions diminished, or preternaturally increased, the capillaries of the extremities and face, perhaps, empty and pale, and there is a strong tendency to rigors, if no local disease exists to account for these symptoms, and no affection of the sensorium to warrant the idea of fever, they are only to be explained by the belief that they arise from a disordered or diseased state of the vascular system. It has been the fashion to refer them exclusively to the heart; but, when it is considered that the minute vessels are extremely sensible to impressions,—are exposed to the contact of blood much altered from its natural state,—and that the larger branches and trunks are subjected to the continual influence of too great distention and impetus from plethora, and frequently excessive action of the heart, it will not seem wonderful that these may get diseased; and, if diseased, that they may inflame, as other diseased parts are wont to do.

ORDER THE SECOND.

Inflammation, having a Disposition to spread, situated in external Parts.

Leading characters of the Order.

There is a very considerable difference, both in the nature and in the treatment, of these cases, and of the external inflammations of the *First* Class, arising from the alarm which is excited in the system by the disposition to spread, which induces a far greater degree of re-action; and, although this very disposition to spread may be intimately connected with want of power, yet, from the violence of the reaction, bleeding, and other active antiphlogistic measures, are called for much more frequently than in the external inflammations of that Class. Also, there is a want of disposition to terminate in the way most salutary to the animal, and, if they cannot be resolved, or subside under the influence of secretion, the tendency to adhesion is deficient, and the suppuration is of a bad kind, not leading readily to the granulating process; for the abscesses are much disposed to extend, even after they have been opened, if not exposed throughout. These remarks must be understood to apply to the severer forms of these inflammations.

GENUS I. *Char.* To produce morbid secretions and resolve.

Family 1*st.* Superficial inflammations of the skin. (Cutaneous inflammations.)

Div. 1*st.* *Papulæ.*
Spec. 1*st.* Strophulus, *&c.*
2*nd.* *Squamæ.*
Spec. 1*st.* Psoriasis, *&c.*
&c. *&c.* *&c.*

The world is greatly indebted to Dr. Willan and Dr. Bateman, for their very accurate and useful arrangement of diseases of the skin, as well as for the valuable information they have given respecting the treatment of these very common maladies. I can have no intention of departing from the system they have proposed, which has fixed more precise notions of the number and the nature of the different species, and has rendered reference to authority far more easy than heretofore. It was, however, incumbent on me, while treating of inflammations, not to omit these, and,

Reasons for including inflammations of the skin in this work.

in the general scheme of arrangement which I attempt, to shew what place they ought to occupy. —Nor do I think that it is amiss to take general views of any subject in different manners. We may prefer one in particular, as the most convenient and natural, but the others serve at once to correct and to enlarge our knowledge.—Thus, an anatomist is not content with arranging the muscles, with reference to their situation, but he also chooses to classify them according to their uses, and *vice versâ*.

Mode of viewing them as inflammations.

1st Division.

There are several which agree in certain characters; such as, in the *first place*, their brief duration; their being attended with more or less fever; their being quite superficial; their disposition to extend, either in spots or patches, or in a continuous form; their disposition to effuse a thin fluid, either with or without separation of the cuticle; and, in many, by the simultaneous affection of mucous membranes. These are the following:—

The more Acute Species.

Rubeola,
Scarlatina,
Roseola,
Urticaria Febrilis,
Erysipelas Erraticum,
Miliaria,

Varicella,
Aphthæ.

The less Acute, many becoming Chronic.

Erythema,
Pompholyx benignus,
——————— solitarius,
Eczema,
Herpes,
Urticaria evanida,
——————— pustans,
——————— conferta,
——————— subcutanea,
——————— tuberosa,
Roseola annulata,
Strophulus,
Lichen.

This division of cutaneous diseases, may, perhaps, with propriety, be included in the present Genus of inflammation.

2nd Division.

Secondly, Four species seem to be allied to boils; in regard to the constitutional affection,—in the disposition to form foul ulcers,—and in the depth of the affection of the skin: these are,

Ecthyma,
Rupia,
Pompholyx diutinus,
Pemphigus infantilis.

The local characters of variola and vaccinia would ally them more nearly to this division: the constitutional affection to the preceding.

Purpura can hardly be considered an inflammation.

3rd Division.

Thirdly. Those which follow seem to be chronic, *i. e.*,

Prurigo,
Scabies,
Pityriasis,
Psoriasis,
Lepra,
Impetigo,
Porrigo,
Verruca (prope Anum, *&c.*)
Acne.

Remarks on the general characters of cutaneous inflammations.

Of cutaneous inflammations in general, it may be observed that they invariably proceed from, or are connected with, constitutional disorder;—that some, having once occurred, never happen again, whilst others seem to have a great disposition to recur at regular intervals;—that most, whether chronic or acute, have periods of augmentation or decline, and, having run their course, become extinct;—some get altogether well in this way, while others are perpetually appearing in fresh places, yet ultimately wear themselves out;—that while some owe their origin to occasional causes; others seem to form a part of the individual, and belong to him as much as the colour of the skin or the hair;—that some are of a nature to be greatly influenced by medicine, applied both externally and internally, while others appear to bid defiance to all attempts to put an end to them before they have exhausted themselves.

It seems that some pave the way to others, or are convertible into others; and, on the contrary, that there are many, which, so far from being allied to each other, cannot exist at the same time.

Acute inflammations of the skin assume definite characters at certain periods, and they will subside of themselves: hence, the treatment required is merely to conduct them in safety through their several stages; and, for this purpose, little more is in general necessary than the negation of all stimuli, cool air or water, gentle laxatives, and acidulous drinks. They are generally calculated to relieve constitutional disorder; and, when pyrexia precedes them, it generally lessens on their appearance, provided an excessive eruption is not maintained, which excites too much sympathetic affection. The chronic, for the most part, depend upon more permanent error of constitution; and for their cure it is desirable that should be, if possible, amended. —But it would be impertinent to go into details.

The general principles of inflammation are capable of being, in a considerable degree, illustrated by the phenomena of small-pox.

I cannot, while on this subject, forbear mentioning the fact, that the phenomena of variola illustrate very satisfactorily many of the points which it is the object of this Essay to establish.

1*st*, The accordance of the general and local affections may be deduced from the appearance of the inoculated pustule; for *from that* the character of the constitutional disease may be with much certainty foretold.

2*nd*, The dependence of the character of the local disease on the general system appears from the *same* matter producing a distinct sort in one, and a confluent one in another.

3*rdly*, and consequently, That the disposition to limit, or to spread, depends upon the type of constitution, must be concluded, also, from the fact last stated; and it may also be observed, that in the former it is sthenic,—in the latter the reverse.

In addition, we may observe*, *a*. the difference

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* *October 7th*, 1820.—There is now a case under my observation, which well marks the dependence of the disposition to spread, or to limit, upon the healthy or unhealthy state of the part; and if of the part, à fortiori of the whole, which includes every part.

A boy, æt. 13, received an injury from a bolt attached to some machinery, which was driven with great force into the arm, a little above the outer condyle,—bared the bone in its passage,—lacerated the capsule of the elbow,—and glanced down the fore-arm about two inches. In the course of four or five weeks this injury was nearly repaired; but the attempt to in point of danger when the type is spreading (confluent), or limited (distinct),—*b*. the increase of sympathetic affection when vital organs are attacked,—*c*. the relief afforded to the internal organs by the eruption and the danger arising from repulsion,—and, *d*. the danger after the eruption has appeared, being proportionate to the amount and situation of the external inflammation.

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give it slight motion renewed the inflammatory action, which was accompanied with an effusion, above the elbow, of matter so firm, and in such large quantity, as to feel like a large deposition of bone, but it was shortly removed by the use of leeches and sedatives.

Just at this time, about eight weeks from the accident, the boy, who is in the hospital, caught the small-pox in the natural way, and, upon the whole, the eruption, although thick, is favourable. On the arm which had been injured, and rendered unhealthy thereby, and in the neighbourhood of the elbow, the eruption is flat and confluent, and extensively surrounded by a dusky erysipelatous blush (and it should be repeated that there was not the least inflammation of the skin at the time the eruption appeared), while on the other arm, and other parts of this, the pustules are few, elevated, and distinct, and surrounded with circumscribed rosy inflammation.

I do not mention this as any unusual occurrence, but as one fact, among many others, calculated to establish the point, that the diffused inflammation depends upon weak powers and an unhealthy disposition of the part, either from its own defect, or as a part of an unhealthy whole.

2nd Family. Inflammation of the mucous glands of mucous membranes, unattended with affection of the organs which they cover, commonly called catarrhal.

Inflammations of mucous membranes analogous to those of skin.

Physiologists have now well established the fact, that there is a great analogy between the structure of the mucous membranes and skin; and it appears that constant exposure suffices to convert the former into a texture as much alike the latter as possible: and the transference of inflammation from the skin to mucous membranes, and from the mucous membranes to skin reciprocally, confirms the truth of the analogy with relation to disease; and for this and other reasons, I believe it may be sufficiently just to include the superficial inflammations of both, in the same Genus.

That the disposition to spread, which attends these inflammations in a marked degree, is owing to the state of the constitution, may be, with much probability concluded from the fact, that mere mechanical irritation excites inflammation which is not propagated in a similar way, as is abundantly proved by the removal of polypus.

The inflammations of this Genus simply affect the mucous follicles and these membranes, in reference to their quality of integuments, whether it be of external parts, as the eye,—or of internal parts, as the nares, bronchiæ, fauces, urethra, bladder, and even alimentary canal; and they merely produce increase of the mucous secretions: such may be admitted as the properties of catarrhal inflammations in general: if inflammation extend, or is seated more deeply in the subjacent textures, the organs they cover will be inflamed, and may suppurate or ulcerate (to which the formation of a vesicle is often a preliminary), and it becomes an affection of more serious import and different nature.

Unless they affect the subjacent organs, or unless it is their original disposition to ulcerate or slough.

Of simple inflammations of mucous membranes, as of skin, it may be observed, that it is their general character to run through a certain course, and subside after an increase of the secretions has taken place. This natural cure being provided, and their progress rarely attended with danger, it is generally sufficient to guide them to their termination; and the means which are to be employed are those which will tend to increase the secretions, to render those secretions mild and unirritating, and to divert the blood as much as possible to the surface, which most readily sympathizes with them; and, if they run on in a chronic state from weakness, to use tonics and change of air.

General character, and principles of treatment.

GENUS II. *Char.* Disposition to imperfect and unhealthy suppuration.

Spec. 1*st.* Inflammation of cysts of chronic abscesses.
2*nd.* ———————— tumors.
3*rd.* ———————— bursæ.

I do not here mean to allude to that kind of inflammatory or otherwise diseased action which causes the formation of such cysts in the body, and the secretion of the fluids which distend them; these processes are truly chronic, and we know too little about them to speak with confidence upon the subject, excepting with regard to bursæ, in which it is very analogous with inflammation of other synovial membranes.

High inflammation follows the exposure of these cysts.

In general, sooner or later, these cysts either open themselves or are opened, in which case high inflammation frequently comes on; and, as Mr. Hunter observes, in genuine abscesses the suppurative inflammation diminishes from the moment they are opened; in these, on the contrary, it is the signal for its commencement.

This, however, is not invariably the case; for, if abscesses are opened cautiously, in the manner recommended by Mr. Abernethy, this inflammation is often prevented*, and the same happens if bursæ are merely punctured.

In cases where the consequent inflammation is severe, the vascular action is amazingly excited. I have counted the pulse within thirty-six hours at 150, and the brain and spinal chord are affected with intense pain. It is irritative fever and irritative inflammation, existing in a very aggravated form; but this soon subsides in suppuration, although the secretions produced hardly deserve the name. They are thin, sanious and acrimonious.

If an attempt is made to maintain the union of external parts, in any case where this state has supervened, the irritation is carried to the highest degree; and, in a very short time, a very alarming state is induced, approaching to typhus, which can only be relieved by giving free exit to the matter now become enormously fœtid.

With some exceptions.

Symptoms of equal severity do not come on in every case. They are, of course, in proportion to the extent of surface, *cæteris paribus*: and it appears that large abscesses connected with diseased joints, particularly ulcerated cartilages, do not inflame with the same degree of intensity. It must also be allowed that if they are opened with caustic, which is a very gradual process, or if allowed to discharge themselves after an incision, no pressure being made, that they are less prone to severe inflammation than they otherwise would be; this is the case also if they open spontaneously, but we seldom can permit this, on account of the great bulk they would acquire.

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* This is in opposition to Mr. Hunter's theory of inflammation of cavities, from their being rendered imperfect; for the cavity is rendered equally imperfect by a small, as by a large, opening, but in general inflammation does not come on if the external wound heals.

After abscesses have been opened, and true suppurative action has taken place, granulations are formed, and a considerable part, if not the whole, is filled up; this cannot be effected if there be disease of the bone, but will be, if pressure be prudently used, in most other cases.

Bursæ.

BURSÆ.—With regard to bursæ, they sometimes inflame and suppurate imperfectly before they are opened; at others they merely secrete an unusual quantity of synovial fluid of unhealthy character, and a substance forming well-known bodies resembling grits*. From the experience I have had of these cases, the former generally soon get well after they are opened; the latter are very troublesome.

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* Dr. Monro speaks of those which arise from rheumatism, sprains, and scrofula; it is the latter kind which he conceives suppurate, though imperfectly. I can only say, I have met with these cases where the diathesis was by no means evidently scrofulous. I suspect the enlargements from rheumatism generally subside again; it is in the cases which arise from sprains or injuries that we are often defeated in our endeavours to procure dispersion. I may observe that they are particularly common in women-servants about the knee from kneeling.

Difference between those which do and those which do not partially suppurate before they are open.

In one case I lately met with, of a bursa situated on the knee which had suppurated, the cyst adhered, after the opening was made, in twenty-four hours with moderate pressure; in some other instances, after discharging pus for a short time in no great quantity, they have filled up.

If I am right in the distinction between these two kinds, it is of some consequence to form a diagnosis between them. The species of bursal tumor which has formed pus is commonly less tense than the other, giving *more* the idea of abscess, and sometimes the skin over it is a little inflamed; indeed these may sometimes be confounded with common abscess, while the peculiarly firm and elastic feel of the others will generally distinguish them. Enlarged bursæ may, however, as I believe, in every instance be known by their situation, their being under muscles or aponeuroses, their history, and effects.

Treatment.

By discutients, pressure, or irritants.

They may be treated in various ways; if discutients, pressure, and irritants fail in removing them, as is often the case, they produce too much inconvenience to be allowed to remain, and surgeons are called upon to get rid of them by puncture, incision, seton, or excision.

In those which have partially suppurated, a free opening will, I believe, suffice for the cure.

By puncture.

In the others, the most simple and least hazardous plan is by puncture, and irritating the sides by a probe, which may produce sufficient adhesive inflammation to unite the sides of the cyst; where this fails, the other modes present themselves.

Seton. The objections to the seton are two-fold; it is liable to produce very severe irritation, and may bring on tetanus, an occurrence not unlikely to accrue from such injury of such structure; indeed I once met with it in a patient for whom I had *opened* a large suppurating bursa under the latissimus dorsi, and it is not without reason that the fear of it is placed before our eyes. Danger from tetanus.

By incision. When incision is used, after some irritative fever, imperfect suppuration is established, and on that follows the production of fungus in lieu of granulations; this fungus sprouts forth freely, and is insensible; but, on the other hand, there is a great deal of inflammation of the surrounding parts, which are highly sensible, and great disturbance of constitution, and the whole has a frightful aspect; however, in the cases I have seen, the fungus has soon been destroyed by the free and repeated application of kali purum, and the irritability of the surrounding parts and constitution subdued by the use of poultices made with superacetate of lead, or the watery solution of opium, and the exhibition of opium freely, combined with antimonials. It is very likely, however, that in unhealthy constitutions, such fungus might be found very untractable.

Mr. Brodie has removed bursæ from the knees in three or four instances, and he was so obliging as to shew me one case in St. George's Hospital a short time since which had perfectly succeeded; and I am quite ready to believe, that if a patient will submit to this operation, it will eventually be found to be the safest, easiest, and most expeditious mode by which he can get rid of the disease. By excision.

TUMORS.—With regard to tumors I have only introduced them because there is some analogy between the inflammation which occurs, the suppuration which ensues, and the fungus which follows, on their becoming open; but I have no intention of prosecuting the subject, although it is one deserving of more attention perhaps than it has yet received.

GENUS III. *Char.* Disposition to resolve or to suppurate and slough.

Sub-genus 1*st*. *Erysipelas.*
- *a. Erraticum.*
- *b. Phlegmonodes.*
  - 1*st*. *Verum.*
  - 2*d*. *Biliosum.*
    - —Var. complicated with inflamed absorbents.

- c. *Œdematodes.*
  - 1st. *Biliosum* in old and debilitated people. (The erysipelas gangrenosum of some authors.)
  - 2d. *Dependent on other diseases.*
    - α. Attending sphacelus senilis.
    - β. From sympathy where there are deep-seated abscesses.
    - γ. Conjoined with, or produced by anasarca
    - δ. From varicose veins.
    - ε. Consequent on bruises.
- d. *Infantilis?*

Sub-genus 2d. Paronychia Gravis.

Much contrariety of opinion about erysipelas.

Erysipelas has received much of the attention of medical writers; and therefore it is not without considerable hesitation I hazard the statement, that this subject is still left in a state of considerable uncertainty. But I am, I believe, justified in saying, that there is much difference of opinion both with respect to the kinds of inflammation which ought to be included under this title;—the nature of true erysipelas,—and the proper plan of treatment.

In the first place, the terms erysipelas and erysipelatous are used by some authors with the same latitude as scrofula and scrofulous. It has been a term applied to erythema*, shingles†, inflammation of internal membranes‡; to burns and blisters§; and, in short, to every kind of spreading inflammation; whilst, on the other hand, it has been restricted to the skin only||;—and it has even been doubted if it is an inflammation¶. We shall

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* Cullen. † Cullen.

‡ Hunter, vol. i. p. 426-7. Cullen.

§ Carmichael Smith.

|| Wetherhead. Mr. Hunter also restricts *true* erysipelas to skin.—Vol. i. p. 479; and Dr. C. Smith.

¶ Pearson, p. 187.

The following sketch will give some idea of the discrepancy between many modern authors of authority on this subject:

CULLEN has	*Sp.* 1*st*. *Erysipelas Vesiculosum*, including E. typhodes, pestilens, contagiosa, of Sauvages. *Sp.* 2*d*. *E. Phlyctenodes*, including shingles. *Sp.* 3*d*. *E. Symptomaticum*. *Def*. *Synocha unius* vel *duorum* dierum. In cutis aliqua parte, sæpius in facie erythema.
BATEMAN.	*E. Phlegmonodes, œdematodes, gangrenosum, erraticum.*
PEARSON.	*Acute, œdematous, gangrenous* or malignant.
S. COOPER.	The same.
C. SMITH.	1*st*. E. from mechanical injury. 2*d*. From heat or cold. 3*d*. The bite or sting of insects.

Definition.

never understand rightly what we are about, unless we give some definite signification to our terms. I should say, then, that erysipelas is an inflammation of the skin in every case, communicated to the cellular membrane in every species but one, the E. Erraticum; with a disposition to terminate in a few days, probably not exceeding seven or eight, either in resolution, or in suppuration, or sloughing of the cellular membrane, very probably both; and in vesications of the surface*, accompanied with con-

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4th. Chemical acrimony. *5th. Fever*, which has the following var.: *a.* the rose or erysipelas of the extremities; *b.* the sideratio, or *e.* of the face and head; *c.* the zona or belt; *d.* the symptomatic, which comes out in patches in bilious, contagious and malignant fevers.

PINEL. *1st.* Simple and fixed.

- Vesiculous, pustular, or zonar.
  - Periodic.
  - Erratic.

2d. Complicated,

- with primitive fever,
  - Gastrico-Bilious.
  - Inflamm.-Phlegmonous.
  - Adynam.-Gangrenous.
  - Ataxic.-Malignant.
- with depraved constitution,
  - The œdematous of newly born.

* Dr. Kirkland has observed the differences of these processes in the skin and cellular membrane, and has accounted for them by saying that in erysipelas phlegmonodes there are two distinct inflammations. Erysipelas affecting the skin,

siderable tumefaction, chiefly from the secretion of serous fluids; and ending abruptly in the surrounding skin.

Why the inflammation spreads in the cellular membrane.

The disposition to spread is very remarkable, and this probably is connected with the circumstance, that the skin is primarily affected; for there is much stronger disposition to the adhesive inflammation in the cellular membrane than in the skin. It also seems probable, that the inflammation spreading over the skin, *leads it* in the subjacent cellular membrane.

Why there is so much disposition to suppuration and sphacelus.

But although there is more disposition to produce adhesions in cellular membrane, it is also more prone to suppurate and slough; and hence these processes are so often the result of erysipelas when extending to cellular membrane: and as the inflammation still spreads along the skin, it spreads also in the subjacent tissue, and these destructive processes are propagated extensively, and as it must be understood at the same time, that it is the character of erysipelas to produce an effusion of

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phlegmon the cellular membrane, each having its peculiar termination; the former in resolution or mortification, the latter in abscess. It is unnecessary to refute this hypothesis I believe; but I may mention that the fact, of this kind of inflammation of cellular membranes having such a disposition to terminate in slough, sufficiently contradicts the doctrine, that every thing depends upon the tissue; for if so, why are not the characters of phlegmon the same.

serum rather than of lymph, the cellular membrane has not its wonted powers of resisting the progress of the disease.

Analogies and differences between erysipelas and carbunculous abscesses.

The more severe kinds of erysipelas considerably resemble the carbunculous abscesses in the disposition to suppurate and slough, the quality of the matter, and the efforts made by the skin rather to confine than to give them exit; but it constitutes a most important difference in their nature, that while the mischief is limited in the former, in these it may spread indefinitely.

Difference between phlegmon and erysipelas.

The differences between phlegmon and erysipelas are also marked and important; the latter differs from phlegmon as anthrax differs from phlegmon, in the character of the inflammation depending upon a highly disordered state of the digestive organs; and it differs from both anthrax and phlegmon in the disposition to spread, and the original seat of the disease being in the skin.

Objections to the term E. gangrenosum.

When the cellular membrane is affected, and the actions are considerable, resembling those of phlegmon, the term E. phlegmonodes has been given to it: when they are languid, or there is much want of power, and the tumefaction is consequently less tense and firm, œdematodes, or gangrenosum.

Impropriety of opposing the terms bilious and phlegmonoid to each other.

To the term gangrenosum, as applied to a particular species of erysipelas, strong objections occur; for it is a termination to which all are liable in a greater or less degree, and therefore it is erroneous to bestow this title on one kind only. It may suffice to divide erysipelas into the erraticum or superficiale, the phlegmonodes, and the œdematodes, with their subdivisions.

At present the terms bilious and phlegmonoid, as applied to this disease, are employed in contradistinction to each other; but as it appears to me improperly, for certainly the bilious character of constitution is often found combined with the phlegmonoid form of local affection.

Division now adopted

Without endeavouring to reconcile objections to terms, which to me seem insuperable, I have taken the liberty of so adapting those we have, as to avoid any very palpable error as I hope; and have divided the E. phlegmonodes into two kinds, the more purely inflammatory, to which I have added the epithet verum, and the bilious; and to the latter have appended a variety which to me appears sufficiently well marked in which the absorbents are inflamed, under the title of E. phlegmonodes biliosum complicated with inflammation of the absorbents. The E. œdematodes will constitute another sub-genus, of which one principal species will be the E. gangrenosum of authors, which is the bilious erysipelas occurring in shattered constitutions.

Having made such alterations in the titles, it will not be wonderful that the descriptions I offer, "*mutato nomine,*" do not exactly accord with those which have heretofore been given under them; and I must here repeat, that the differences to be found in approved authors on this subject, as they lead to much perplexity in the study of a very important branch, afford also some excuse for an attempt to re-model them, since it may be presumed that if we were in possession of any plan tolerably free from defects, that would be more generally assented and adhered to.

ERYSIPELAS PHLEGMONODES VERUM.—The more purely inflammatory species of erysipelas generally occurs in young persons, particularly females, from cold, or suppressed discharges, and most frequently in the face. It may be assumed that erysipelas never takes place without considerable error of the digestive organs, particularly of the biliary system. In this species, however, this affection does not predominate at first, although, as Dessault has observed, it manifests itself in the course of the malady.

Characters. There is a high degree of pyrexia, burning skin, and very severe affection of the head.

It generally terminates in resolution, if well managed, in the course of a week or ten days*.

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* There are admirable descriptions of this form of erysipelas in Cullen, Dessault, and Pinel.

If the symptoms are very high in this species, authors seem agreed that blood-letting is necessary, at all events cool air, and other parts of the antiphlogistic regimen.

Dessault condemns antimonials in the beginning.

The Erysipelas Erraticum, of Bateman, might perhaps be considered a variety of the E. phlegmonodes, occurring in a slight degree, and very rarely affecting the cellular membrane, and from this circumstance is very analogous to the exanthemata. Hence its remarkable disposition to spread, and little tendency to suppuration, which seem to exist almost in an inverse ratio to each other. I almost doubt whether this slight form ought not to be placed among the cutaneous inflammations of Genus I.

Erysipelas Phlegmonodes Biliosum.—This is the most common form of the disease occurring in adults of all ages, if moderately robust, but more especially to persons in gross habits: when idiopathic, *generally* in the face; when symptomatic, in the legs; but it is also liable to occur after wounds or operations in *any* part, and more particularly after the amputation of the female breast.

The body seems to be predisposed to this form of the disease, either from original bilious tempe- Causes.

rament; from temporary disorder of the digestive organs; or from foul or infectious air*.

Characters and progress. Pyrexia generally precedes the appearance of the inflammation a day or two, but increases with it.

"*Rubor subflavescens*" is the term which best designates the colour of the inflammation; and the more unmixed and rosy the red, the less is the bilious character.

The heat of the part, and of the whole body, is scalding and intense to the touch, and it is very dry.

The pain is burning and sharp, but there is little tenderness at first in the majority of cases.

The tumefaction is at first inconsiderable; the margin irregular and abrupt. There is a roughness on the surface.

The swelling soon commences and is rapidly communicated to the subjacent cellular membrane, which becomes much loaded, firm, and tense; and throbbing is now sometimes superadded†. Vesicles, or buleæ, also form on the surface.

In a few days, either the swelling and other symptoms subside, and the inflammation spreading a little at the edges becomes less intense, and vanishes, going off as a mere affection of the skin; or abscess forms in the cellular membrane, which is but imperfectly limited, perhaps slough also; and the skin either ulcerates or sloughs to give vent to these matters.

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* The remote causes are well summed up by Mr. Pearson, p. 193.

† The absence of throbbing has been accounted a diagnostic. It is so generally, but not invariably.

The pulse varies; it is generally frequent, often full and bounding, sometimes hard, if there is much loading of the cellular membrane.

The tongue, thickly coated, moist, and bilious. The thirst often intense, great disposition to nausea, and even vomiting. The discharges from the alimentary canal upwards and downwards, bilious and depraved, and accompanied with great relief.

The pain in the head intense, particularly over the eyes; and in severe cases, any motion of the head gives a disposition to nausea: tendency to restlessness and delirium in the beginning, to coma in the latter stages.

The pyrexia increases with the local disease, and terminates, if it be resolved, in about a week; but if abscesses or sloughs form, it may be prolonged.

The danger is in proportion to the extent of the disease; the situation, if in the face (or, as I believe, in the legs,) and the degree of delirium; in general, however, patients come safely out of the phlegmonoid forms of erysipelas.

Treatment.—As there is a difference in the nature of the true and bilious forms of erysipelas phlegmonodes, so there is in the treatment also. In the former, all authorities are in favour of bleeding, if the symptoms are severe; in the latter, it is discountenanced by many*, particularly by Dessault, and tartrite of antimony is represented almost as a specific.

Bleeding.

Dessault condemns blood-letting in bilious erysipelas; and, however much it may serve even in many inflammations whose tendency is to asthenia, yet there can be no doubt that there are others in which it does much mischief: the question is, whether in the present species it is advantageous or not?

I should be disposed to think, both from what I have seen, and from such inferences as may be fairly drawn from other cases of inflammation, that bleeding is justifiable and proper, where there is a full, strong, bounding pulse; much heat of the skin; and much loading of the part, and *where the tension of the surface indicates a considerable share of action and power;* although there may at the same time be the most unequivocal proofs of especial disorder of the alimentary canal and liver: but as such a state is particularly liable to induce an unfavourable termination, bleeding must be instituted with great caution. I have rarely practised it myself; but, where I have, the symptoms have abated in consequence, but the recovery has been protracted.

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* Perhaps much of the difference of opinion with respect to bleeding, may be accounted for by the want of discrimination of the different kinds of erysipelas, which in some authors of high authority is very remarkable.

If it be argued that as bleeding will cure even asthenic fever, therefore, *à fortiori,* it ought to cure a kind of inflammation not absolutely connected with asthenia, but only liable to terminate in it: The answer is, that the analogy certainly does not apply, as the event verifies; and the reason seems to be this:—bleeding will cure *simple* inflammation, let it occur in any part of the body, but it will not change that state of the digestive organs on which this inflammation depends.

The legitimate use of bleeding in erysipelas seems to be, to keep the inflammatory actions within certain safe bounds, till the faulty state of the constitution can be corrected; or, to conduct the disease through the stages which it naturally passes.

Removal of the disorder of the primæ viæ.

The principal indication in bilious erysipelas is to remove the disorder of the primæ viæ. Dessault tells us that this may be effectually done by tartrite of antimony alone, dissolved in a large proportion of water. From experience, I should be inclined to prefer the common purging mixture, with such a proportion of tart. antim. as may excite vomiting as well as purging, or, at all events, considerable nausea*; and, where there is good reason to believe that there is an accumulation of fæces, a dose of calomel may advantageously precede.

The purgation may be pursued by similar means while fœcal matters which have been long retained in the canal continue to be evacuated; while the discharges are morbid secretions of a fœcal nature; while they improve under the plan; while the tongue at the same time cleans; the strength does not sink; nor the inflammation spread rapidly.

After this, the bowels are to be moved by such medicines as will give them some degree of tone,—such as rhubarb and tinct. sennæ; and at the same time saline draughts in effervescence, with antimonial wine, may be given; but if, notwithstanding our

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[*] My friend Mr. H. Earle informs me that in erysipelas from contagion, which prevailed last summer to an alarming degree in St. Bartholomew's, he found purges composed of calomel, tart. antim., and rhubarb, with the local application of a bread poultice, made with spirituous lotion, constituted the most successful mode of treatment.

About the same period, erysipelas occurred in this hospital,—in several instances, no doubt, from infection; and three cases on whom I had performed operations (two of which were amputation of breasts, and one of a thigh) suffered from this cause. The treatment I pursued was such as I have stated, and they terminated without any important mischief. One of the women was bled as she seemed to require it: she remained weak much longer than the others.

best endeavours to remove the disorder of the primæ viæ, and stop the local mischief, things are getting worse, what measures are to be pursued? Is bark to be given?

When there is much disorder of the primæ viæ, bark is hardly a safe remedy; yet in many cases it is a very valuable one,—always, if it agrees. It is often worth while to try it; but the effect it produces must be carefully watched. Bark.

We are directed to wait till the tongue cleans: this change often does not take place at all; and, when it does, it is, perhaps, immaterial what we do. I should judge rather by the state of the alvine discharges; for the presumption is, that when the old fœcal matters have been cleared away, and the secretions are copious, and not very bad, bark may be borne with advantage; or, when they are copious, and cannot be improved by other means, that bark ought to be tried. I cannot say that I have ever been able to see any clear criterion in these cases, when it ought to be employed; but, when other measures fail, it is too important a mean to be neglected, and no great harm can arise from the experiment, in a doubtful case, if it be watched.

I believe that bark is most decidedly useful in the E. erraticum, given in the form of decoction, and combined with mineral acids.

It may be right to combine it with sulphuric acid, or with liq. ammon. acetat., perhaps adding some warm tincture. It may be advisable to try it in decoction, before we employ it in substance*.

Other medicines. When bark does not agree, much benefit will often be derived from a combination of the liq. ammon. acet., with conf. aromat., either with or without camphor.

When, from the exhibition of food or medicine in too great quantity, or at an unseasonable period, fresh embarrassment has taken place in the stomach, I have seen great relief afforded by a gentle emetic even in an advanced stage of the disease.

Soda-water, either alone or with a small quantity of wine; wine in small quantities, with arrow-root or gruel, or in small whey, or negus, rather as a *stimulus to the stomach* than as a spur to the vascular system, is a medicine of great efficacy, prudently given†.

Air. During the whole process, cool, and fresh, and healthy air, if they can be procured, are of infinite service, together with attention to cleanliness, and the removal of every thing which can give to the atmosphere in which the patient is placed, the smell and qualities derived from a bed-room.

When abscesses have formed and are open, and sloughs are to be discharged, bark and wine, freely administered, are often (but not invariably) useful.

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* Mr. Hunter, in various parts of his work, expresses himself very strongly in favour of bark. Vol. i, p. 465, he expressly states that it is to be given in erysipelatous inflammation; and Sir Gilbert Blane appears to be a very warm advocate for its employment in this disease.

† Of course I now allude to those periods of the disease when some support is indicated.

When the head is much affected, sinapisms and fomentations to the feet,—blisters on the scalp, or nape of the neck, are useful: but, when the head is affected, from the retrocession of erysipelas, it becomes necessary to bleed largely, and blister the scalp,—or, as Dr. Kirkland advises, the back, between the shoulders.

Local applications.

With regard to local treatment, a distinction is undoubtedly to be made between erysipelas connected with local injury, and that occurring spontaneously. With regard to the former, I can have no question as to the absolute necessity of employing local means to check the mischief.

Indispensable in cases arising from injury.

Objections to their employment in idiopathic erysipelas, very questionable.

Physicians have commonly held, that it is neither safe nor useful to interfere locally with erysipelas occurring in the face. This may be a good rule in many cases, but I am entitled to doubt it, as applied to all: for, where the tension, heat, and tumor, are very great, these may frequently be moderated, not only with safety, but advantage; and, indeed, the principle on which this is denied, is questionable; for it must be remembered, that, although other eruptive inflammations, as small-pox, scarlatina, measles, *&c.*, relieve the general system by their appearance, and serious mischief arises from their repulsion; yet, if the local symptoms are severe, they aggravate the fever, without any perceptible benefit whatever. The same thing, I am convinced, frequently occurs in erysipelas.

Again: no one will contend that any part of the utility of erysipelas depends upon the formation of abscess; on the contrary, this termination may be considered as a proof of its having passed its proper bounds.

It may, then, be, and, I believe is, justifiable to moderate the local affection if the actions are high, by cool air, tepid evaporating lotions, or poultices*, and especially by keeping the whole body cool. If injurious effects arise from these means, they should, of course, be stopped, and such injurious effects will probably be indicated by increase of the pain of the head, or sickness*.

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* The utility of the bread-and-water poultices, in most cases, but particularly in these, will depend upon the care that is taken that they should be what they ought to be.

A thin soft pulp of bread is soothing to the feelings of the part—light and cool; but, if it is lumpy, harsh, or heavy,—if it stays on till it is sour and hard,—more especially if it becomes crusty at the edges, it will irritate exceedingly. It is necessary that poultices should be made carefully; applied properly; and these changed often. No one who has not attended to the different effects of the same remedy (if it may be called the same) under different management, can have an idea how much depends thereupon. Poppy-head decoction may be used with great advantage, instead of water, in making them.

Mr. Pearson recommends the use of diluted rubefacients in erysipelas, but of these I can say nothing.—He also speaks highly of a compound cataplasm. It may be observed of the former, that M. Dupuytren goes so far as to apply blisters to the surface, and it is said, with advantage.

In this form of erysipelas, I conceive the dry powders recommended by Cullen and others are likely to prove very pernicious, by irritating a surface which, after a time, becomes so highly susceptible, that it can perceive the least difference in the softness and smoothness even of rags applied to it. The exudation from the vesicles may, at all events, be cleared away without forming it into crusts with flour.

Leeches.

Leeches have been generally condemned in erysipelas, and it is very certain that they often give rise to it, perhaps as immediate causes the predisposition being in the constitution; yet I have applied them in cases of erysipelas already existing early in the disease, not only with no detriment, but to the manifest advantage of the patient. I have never, however, ventured this practice without apprehension; I can only state what has happened, but will not venture to recommend it[*].

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* Dr. Kirkland says, (vol. i. p. 338.) "As neither the membranes nor skin which seems to be the part affected in this disease can suppurate, it is evident discussion is the only rational method of attempting a cure." Dr. Kirkland applies this generally, but, as far as regards the nature of the disease, it is only true in E. erraticum, but the treatment seems to have received the sanction of his experience. He is very decisive and strong upon this point, but his observations are much less valuable than they otherwise would be, from his making little or no discrimination of the different kinds of erysipelas.

When matter is formed, the most important point in the conduct of the disease is to give that early exit[†]; on which point I shall say more presently.

The type of erysipelas invariably tends to asthenia: if putrid and irritating matter is from any cause lodged in the body, a sympathetic inflammation takes place on the surface, and that is erysipelas. It is from this cause I apprehend that it so often occurs after wounds or operations, in which extravasated blood loses its vitality, and becomes putrid and offensive; hence perhaps in part the frequency of erysipelas after wounds on the head; for, from the looseness of the cellular membrane of the scalp, blood is very apt to be effused under it; and if so, to run into a state, if not of absolute putrefaction, at least one which renders it irritating and noxious; so that it *excites* inflammation and reduces the powers at the same time.

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[*] It might *à priori* be expected, that in a constitution labouring under erysipelas, this affection might attack a blister applied to any part of the body. This fear is, however, I believe, groundless; I have never seen this occur where they have been employed; I have seen erysipelas spread from an ulcerated leg over the whole limb; where there were two unhealed blisters on the opposite side, which shewed no disposition of the kind; and finally, it is understood that Mr. Dupuytren, in France, applies blisters for its cure: so that there should seem to be something in the nature of the inflammation excited by blisters specifically different from that of erysipelas; and I even doubt whether it might not be a fair experiment to surround a part, or the whole of a limb, in which erysipelas is spreading, with a strip of blister-plaster with a view of stopping it, even if we were too cautious (which I should be) to apply it on the part itself.

[†] To this Dr. Weatherhead objects, maintaining that it protracts the peculiar action of erysipelas, p. 15. The result of what I have seen would lead me to an entirely different conclusion.

Blood extravasated and putrefying often a cause of erysipelas.

Erysipelas Phlegmonodes Biliosum, combined with inflamed Absorbents.

There is another variety of erysipelas, which seems to have escaped the distinct notice of most authors who have written on this subject, though it is easy enough to perceive that it has not been wholly unobserved. We are, however, indebted to Mr. Hutchinson for the only particular account of it which has yet been published.

Nature of this variety.

It seems to be a combination of the bilious form of the phlegmonoid erysipelas with inflammation of the absorbents, and bears some resemblance to gangrena noso-comialis, though there are some important points of difference; *i. e.*, its occurring frequently without the influence of infection; (which *may* be the cause, but is not necessarily so by any means;) though generally springing from an ulcer or breach of surface, that ulcer not sloughing till influenced to do so by the surrounding mischief; the great progress of mortification under the skin, rather than on the surface; and the want of circularity of the sore.

Situation and subjects in which it occurs.

It occurs on the inside of the leg in young or middle-aged *men* in general, and more frequently among soldiers and sailors than any other class of people*; perhaps, because they are more exposed to injuries about the legs than others, and at the same time are in the habit of using a full diet of animal food, and much malt or spirituous liquors. It is not, however, unusual in civil hospitals and private life, and in adult males of all ages, but is very rare in females.

Conjectures as to its cause.

It most frequently begins about sores which are *nearly healed*, or have been recently irritated. From the former circumstance I have been led to indulge in a conjecture, that the healing these sores has acted prejudicially on the constitution, and has given that disposition which leads immediately to the attack in question.

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* Mr. Hutchinson attributes the *general* disposition to the nature of the diet of sailors, the use of strong liquors, and the sudden alterations of temperature to which they are peculiarly exposed;—and the *local* to their legs being particularly liable to be exposed to the contact of salt-water. Its frequent occurrence among soldiers, however, proves that this can at most be an occasional cause.

I have seen it particularly common at a time when boils are very prevalent, and have also conjectured that a nearly similar state of constitution which would otherwise have produced boils, occasioned this inflammation if there happened to be a sore on the leg.

Cause of its peculiar characters.

The peculiar character of this disease depends much upon the inflamed state of the absorbents*; yet absorbents do not seem to inflame in healthy sores or healthy persons, and their doing so seems to be owing to the peculiar disposition which produces this disease.

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* Inflammation of the absorbents more or less, but often to a very considerable extent, has been an invariable concomitant, and indeed prominent feature in the cases to which I allude, so as to leave it a matter of doubt whether this species of inflammation should be classed with inflammation of the absorbents or with erysipelas; at all events, sufficient to establish a strong criterion of difference between it and E. phlegmonodes simply. It is rather singular that Mr. Hutchinson in his account makes *no other* mention of it than by saying, "The absorbent vessels of the parts affected also take on a morbid action, their energies are greatly increased, and the inflammation is *ultimately* communicated to their coats; and when the disease has been seated in the leg or fore arm, we have been enabled to trace its course all along the lymphatic vessels to the trunk in the form of red lines, till lost in the inguinal or axillary glands."—P. 83.

Description of the disease.

Local symptoms.

At first the sore looks crude, irritable, and dry; a blush is seen around it; streaks run upwards and downwards in the course of the absorbents; the limb soon swells, and loads enormously; there is extreme burning heat and pain, with *excessive tension*; the colour becomes dusky and high, mottled with livid; phlyctenæ form on the surface, and the cellular membrane below suppurates and sloughs extensively, looking like large wads of wet shamoy leather when separated, the matter formed being at the same time foul and offensive; an ineffectual effort is made to confine this, and the skin thickens more, but the inflammation goes on spreading, and as it spreads fresh abscesses and fresh sloughs form, which sloughs very often comprehend the fascia of the limb*. The skin does not point over these, but at length gives way, if the patient lives, either by sloughing or ulceration; and when the sloughing process has once taken place on the skin, it may spread extensively, perhaps uncontroulably. At all events when the surface is broken, it is disposed to ulcerate away with uncommon rapidity.

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* Mr. Hutchinson considers the peculiar seat of the disease to be in the aponeuroses, and that pus forms beneath these, and that they consequently slough. There can be no question that they are often involved in the mischief, and that matter does form beneath them; but I believe that the skin, and very particularly its lymphatic vessels, and the cellular membrane beneath it, constitute the principal and primary seat of this disease. 1*st*. Because the inflammation seems evidently to commence in the skin, and be communicated to the subjacent textures. 2*d*. Because sloughs very similar form in parts where the fasciæ are inconsiderable or altogether wanting, as in the buttocks near the anus; in perinæo, in the neck, *&c*. And, *thirdly*, because in the lower extremity they form extensively on the inside where the fasciæ are thin, and very little on the outside where they are thick.

Abscesses also often form all the way up the thigh and down the leg and foot in the course of the inflamed absorbents. The lymphatic glands too inflame and suppurate, and seem to check the spreading of the inflammation. In them its character approaches more to that of phlegmon, and the pus is of a better description than in the leg.

When by the efforts of nature or the assistance of art, the sloughs are thrown off, and the matter evacuated; healthy granulations spring up from the bottom, and what remains of the skin of the leg is soon *inseparably united to the surface below, and the patient is left with a rigid state of the integuments of the legs loaded with cicatrices.

The sympathetic fever which this inflammation excites is excessively severe, bearing a constant proportion to the degree of local inflammation, varying with its different stages, and proving itself a cause of great increase of the local mischief. A bilious character predominates; the tongue thickly coated, and yellow; great thirst and nausea; ex- General.

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* It is right to state, that Mr. Hutchinson has in his practice found the contrary.

cessive pain in the head, with flushed face; pulse very frequent, strong, and full; respiration often hurried *; skin burning, secretions very scanty.

As the sloughs and matter form, the tongue darkens, the pulse becomes more hurried and irregular, and delirium supervenes if not earlier. If the local disease goes on, the patient dies typhoid †.

Treatment.

In this species of erysipelas there cannot be the slightest doubt of the extreme importance of local treatment, which will indeed more effectually than any thing else control the sympathetic fever.

If a surgeon is called to a patient labouring under this disease, in the very beginning it is easy enough to check it; but if the limb has already loaded much, it is often uncontrollable, and all we can hope to do is to limit the mischief.

General intention.

There is excessive action both local and general, to check which the most energetic measures must be pursued.

Mr. Hutchinson's practice.

Mr. Hutchinson has recommended the free use of incisions in the part to set free the tension, and take blood locally; two very important objects;

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* This picture is drawn from the worst cases, and many shades of greater or less severity may be observed in practice.

† The function of respiration affords a very important indication in diagnosis. Where it is frequent and anxious, the system is severely affected; often there is much danger, and the state of the system partakes of want of tone, if not absolute asthenia; where it is frequent and laborious, there is generally power.

and the result of this mode of practice in his hands, has been to relieve every case in which it has been employed. I have not made sufficient trial of the plan to speak with any authority on the subject; those cases which I have treated in this way have not derived all the advantage from it which I have been led to expect; but, on the other hand, the tendency of the wounds to run into mortification was not so great as might by some have been apprehended. It is a mode objectionable from its severity, if less harsh measures would succeed, and perhaps attended with some hazard. We have, however, the testimony of this able practitioner for its utility in a large number of cases.

Speaking from experience, I may say, that there can be little doubt of ultimately extricating a patient from the dangers of this disease with much care and good management; but if either are wanting, his life will be in imminent peril*.

Cold, manner in which it need be used.

I believe the use of cold is the most suitable and successful mode of controlling the actions in this inflammation; but to render it so, it must be most efficiently employed. A few rags, wetted in a lotion applied to the part inflamed, will do nothing; wet swabs must be most freely and assiduously applied to the whole limb, and often the whole body sponged with cold water at the same time, when the general heat is intense.

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* "Among the various diseases incident to seamen on board his Majesty's ships of war, the frequent occurrence and generally unfavourable termination of erysipelas, cannot but have attracted the attention of the naval medical service." It is thus Mr. Hutchison commences his paper.

When the actions are not very high, the lotion, with superacetate of lead, and a small quantity of alkohol, will be a very useful application, and seems to accord with the inflammation; it allays the irritability of the skin, but in proportion as the actions are more severe, the quantity of alkohol must be diminished; and when they exist in a very high degree, the coldest water that can be procured, and often changed, is the only thing to be depended upon.

Neither will it do to intermit the use of cold; for if, after the actions are reduced by its efficient application, the patient be left at night with a negligent or sleepy nurse, the inflammation will return with equal severity as before.

Position. Evaporating poultice to the sore.

The actions are greatly increased by the tension of the skin, which binds the limb like a tight roller, and seems ready to burst; a state which undoubtedly would be relieved by the incisions recommended by Mr. Hutchinson. But, short of this, much good may be done by raising the limb above the horizontal line, and to the sore and original seat of the inflammation a soft evaporating poultice may be applied; this will soften and relax the skin, and often encourage secretions, which will tend more than any thing to reduce the inflammatory action; and we may trust to the *cold* applied to the rest of the limb.

Evacuation of matter and sloughs.

When foul matter and slough form in any part, they immediately communicate an unfriendly disposition to all those surrounding, and the type of the constitutional affection changes; when confined, their influence is greatly increased, and it is a most important indication to evacuate them as soon as possible.

Effects they produce.

In inflammations of this kind, when matter is formed, it is neither walled in by adhesions in the cellular membrane, nor led to the surface by that process which we term pointing; from the former circumstance their residence in the part becomes particularly injurious, and from the latter there is often considerable delay before an opening either spontaneously occurs, or is effected by art.

Indications of their existence.

Although there is great difficulty in ascertaining the existence even, or the situation of such collections; yet an accurate examination will often detect them. They may be sought for in the neighbourhood where the inflammation commenced, or in the calf of the leg; the spot may often be ascertained by a sensation as if there were a quag under the skin, if that be pressed upon pretty firmly. The swelling of the limb is produced chiefly by the effusion of serous fluids *; but this is carried so far, with the addition of some lymph, and the blood with which the vessels are loaded, as to render the surface perfectly hard and tense, except at those points where the thinning process has *partially* commenced, and where there may be perhaps a *slight* tendency to pointing; but even here, *firm* pressure will be required to ascertain the state of the subjacent parts.

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* The fluid which escapes from the cellular membrane of patients who have died of erysipelas, is like dirty brown or greyish serum.

At these places too the colour is often more dusky, and if in addition, there are phlyctenæ on the surface, there will be still greater reason for believing that matter is situated underneath, and on the timely evacuation of this the safety of the patient depends.

Mode in which they are to be let out.

It is at all events better to err by making an incision unnecessarily, than by omitting to do so when it is required; from the former conduct mischief rarely ensues, from the latter always. I have generally contented myself with thrusting in a keen double-edged knife, deeply; and if matter has followed, converted the puncture, (which gives little pain), into an ample incision. It will be necessary to make this *deep*, as it has to penetrate the loaded skin; and *large*, as a free opening is required to give vent to the sloughs and matter, and also to answer another very important purpose, to set free the tension, an object of the first consequence. If we make small openings, such will be the stress upon their edges, that they will rapidly ulcerate or slough, till, by these processes, they are rendered large enough. If we at once make them so, they will gape, and immediately relieve the tension at the part, and presently of the whole limb, by giving vent to the matters contained under the skin, and allowing the serum to drain off; the bleeding also will be beneficial*.

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* Mr. Quesnay attached much importance to the influence of aponeurosis in causing strangulation, and thereby inducing sphacelus. Mr. Boyer recognises the advantage to be derived from making incisions to free this, p. 114. It is my belief, however, that the tension produced by aponeurosis is not by any means so often injurious as that arising from the state of the skin itself, and for this simple reason; that as far as I have observed, there is reason to believe that in the great majority of instances the mortification has commenced above the aponeurosis. In a practical view this point is not very material, for the aponeurosis cannot be divided without the skin. M. Boyer it seems, however, discourages the practice of scarification in gangrene in general.—P. 116.

When Mr. Hutchinson published his paper on the use of incisions in this disease in the *Med. Chir. Trans.*, I was immediately led to believe that the practice might be safe and useful, from having employed them so freely, and with so much advantage at a different period with a different view; *i. e.*, to evacuate the matter and set free the tension; and that I have not yet been able to satisfy myself on its expediency in the commencement must be attributed to the objections which in civil practice are often opposed to innovations, however proper they may appear. The discipline is censured as severe, and no doubt it is; but those who have often witnessed the danger and the havoc arising from this form of erysipelas, will not think that immunity from such consequences is dearly purchased at the expense of the temporary pain they inflict.

Wherever the matter may be contained, there, without hesitation, openings should be made to give it vent, and they may be repeated as often as they are called for by the formation of fresh abscesses; for it is the property of this inflammation, after it has subsided in one part, to spread with the same mischievous consequences to others; and foul matter and sloughs run under the fascia, as well as the integuments, and separate the muscles extensively, and until all these are evacuated the disease will not end.

I believe that the practice of scarifying (as it has been termed) in gangrenous inflammations, was both adopted, in the first place, in a considerable degree, and has since been abandoned, on erroneous principles.

Observations on the old practice of scarifications in gangrenous inflammations.

One of the chief objects for which they were originally performed is trifling, *i. e.*, to allow of applications being made to sound parts beneath[*].

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[*] The objects proposed by the ancient surgeons to be effected by scarifications, were, 1*st*, to free the strangulation which was produced in the arteries or veins by the contraction of nervous parts, by which they meant aponeuroses, and which one of the most eminent (Quesnay) seems to have considered a more frequent cause of mortification than any other: this, I believe, rarely occurs, excepting from the swelling of parts under fasciæ, in cases of external injury: but the incisions which would set free the tension of the *skin*, were, and are, probably, beneficial in most cases where it exists, since this very tension is one chief cause of the inflammation terminating

One objection to them is equally so: that they can do no good when made through parts that are already perished. The advantages which may, and often are, derived from incisions in this state, have just been mentioned: the only question is, whether we are justified in making them through skin which is approaching to mortification. In the present disease I have no doubt on this head: in other species I will not undertake to say what ought to be our conduct, but I believe it should be much regulated by the consideration of this point—*that where the affection of the cellular membrane predominates over that of the skin,* it will be particularly likely to prove useful.

When the sloughs come away, the limb should be carefully rolled with a bandage dipped in a spirituous lotion. It will soon cause the sinuses and hollows to adhere; and give tone to parts whose powers are now greatly exhausted. On the mode of doing this effectually, Dr. Dewar has

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in mortification;—*2ndly,* to evacuate the fluids contained in the parts, an object desirable in every respect; and, *3rdly,* to allow of applications being made to the parts still alive, which was with them a very favourite object, to resolve, dissolve, liquify, cause them to circulate again, or prevent their putrefication. We here suppose that the scarifications or incisions are to be made before they are dead. This purpose, therefore, need not now be discussed; but I believe it is, in all cases, either nugatory or condemnable.

given a most excellent paper in the *Med. Chir. Trans.;* and, though the principle he enforces is sufficiently simple, it has not, perhaps, been sufficiently attended to.

General treatment.

With regard to the general treatment, the same observations will apply which have been made respecting the conduct of the bilious form of erysipelas phlegmonodes in general; but, if the disease is so severe as to make bleeding desirable, and the constitution be such as will bear it, it should be performed early; for, when sloughs and matter form, support is most unquestionably required.

Same general principles as in the other forms of erysipelas phlegmonodes biliosum.

Circumstances which peculiarly influence the fever in this form of disease.

The fever which accompanies this inflammation often assumes a mixed character, after the earlier stages, and from the following circumstance: In one part of the limb the sloughing process will be going on, and communicate to the system the typhoid disposition which ensues from this cause; while in new parts the inflammation rages with a different character, and the sympathy of the constitution will partake of the two. There will still be a high, bounding, though hurried, pulse; while the dark tongue, delirium, and offensive secretions, and thorough depression of strength, give evidence of the typhoid state.

In addition to what has been said on the treatment of erysipelas phlegmonodes biliosum, generally, there is in this species one very important remedy, the employment of which I am induced strongly to urge, and this is opium.

On the use of opium.

The pain is often excessive, and the irritation great. If these are allowed to act day and night, it is inconceivable how much they tend to increase the mischief; and, to obviate these, opium may be exhibited, after free evacuations have been procured, with the greatest advantage. It should, however, be given in this kind of inflammation at night, to *procure sleep;* and in quantity sufficient to answer that purpose, whatever it may be, and in combination with other medicines, such as antimonials, effervescing draughts, sulphuric acid, or in some cases with calomel; and its effects may be greatly assisted by applying cold cloths to the forehead and head, which, without preventing its sedative influence, obviates its injurious impression, and often converts a forced sleep into a calm repose.

When the powers sink.

When the pulse sinks, and extensive sloughs are separating with copious discharge, the life of the patient will depend upon the support he receives. Wine may be given largely with gruel or arrowroot, but in small quantities at a time. Broth, too, or beef-tea, if the patient wishes it: and bark, rendered grateful with sulphuric acid, will now be very useful. The object is, 1*st*, to prevent the patient from sinking till the local mischief can be stopped; and, 2*ndly*, to remedy that as effectually as possible. Matter should be evacuated as soon as it forms; there is no longer tension; the limb is in a state of *affaissement*; and judicious bandaging will prevent the matter from spreading, and give tone to the part, and spirits, not much diluted, may be freely applied with advantage. It should be recollected that there is no irremediable mischief in these cases, and no patient should be despaired of while life continues.

ERYSIPELAS ŒDEMATODES.—The second division or subgenus of erysipelas is well described by this term. The affection extends to both skin and cellular membrane, but in the latter its disposition is to effuse a fluid, more exclusively serous in its nature, with less admixture of lymph than in the phlegmonodes. In the latter, lymph will be found adhering to the cells of the cellular membrane, and pus is very readily formed. Here the disposition to slough predominates, and but little lymph is thrown out. In the phlegmonodes the local action is so great that the part is full and tense: here, on the contrary, it is soft and pasty, and pits readily.

1st Var. The bilious erysipelas occurring in old and shattered constitutions.

The skin is of a dull colour, approaching to mahogany or chocolate, in different shades, according to its intensity, mixed with yellow. The heat is rarely great, whence it has obtained from the French writers the appellation of "*froid*." The pain, however, is often severe, and so is the *sen-*

sation of heat; it spreads rapidly and sloughs, and foul matter speedily forms.

Its local and general characters.

There is often considerable re-action of the vascular system from the violent alarm; but, as it commonly occurs in persons of old, enfeebled, and generally gross constitutions, the powers are too frequently incapable of resisting the mischief; and as the local disease extends and mortification occurs, the pulse sinks, and a typhoid state and death speedily ensue.

This appears to be the bilious form of erysipelas occurring in constitutions incapable of maintaining vigorous inflammation. Aged people, it must be understood, not unfrequently are affected with erysipelas erraticum, and may escape with impunity; but, if the cellular membrane is concerned, which often happens, and if their habits are gross, they will get this form of the disease, and are in great danger.

Treatment.

Depletion carried to any extent in these cases is fatal, and bleeding is inadmissible. Purging is commonly necessary, from the loaded and disordered state of the alimentary system; but great care is required in the use of purgatives, and support is to be given at the same time, and speedy recourse must be had to cordial medicines.

Spirituous lotions are often useful as local applications, but if they do not suit the skin, bread-and-water poultices, kept warm, will prove beneficial, or moistening the poultices with a weak spirituous lotion.

In this kind of erysipelas, the skin has almost as great a disposition to mortify as the cellular membrane, in which it differs greatly from the phlegmonoid form.

Fermenting poultices often constitute excellent applications after sores have been produced and as long as there are sloughs to separate.

Erysipelas œdematodes, from local causes.

A variety of the erysipelas œdematodes seems to occur as the precursor or attendant of sphacelus senilis.

A similar form of inflammation seems often to take place from causes which are purely local: thus, after a severe contusion, the integuments are often left in an œdematous state, some degree of action being superadded; this, however, rarely leads to any mischief in persons of good constitution: it arises simply from a local want of power, the injured vessels not having recovered their tone.

After contusions.

I have seen, under such circumstances, a limited abscess form in the midst of this state of integuments, and the increased action extending from it to them has induced genuine erysipelas œdematodes, but without any ill consequence.

Where matter is deep-seated.

Where matter is deep-seated, a sympathetic affection of the skin often occurs, and that bears the character of the œdematous erysipelas.

In anasarca.

There is an inflammatory affection of the erysipelatous kind, which supervenes on the skin when it has been long distended by anasarca, particularly in persons of enfeebled habits, or parts of weak powers, such as the legs and scrotum. It rarely occurs in œdema solidum, or, indeed, in anasarca, excepting under the above conditions.

The cause may ultimately be referred to pressure from distention.

Many authors consider it as an erythema*, but it would be better, perhaps, to restrict that term to a mode of inflammation in which the skin neither sloughs nor suppuration occurs. In this it does slough after a time, but suppuration rarely takes place.

The most effectual plan of relief is by removing the tension; but the practice in these cases is too well known to require any remarks.

From varicose veins.

In the legs of elderly people, especially where there are varicose veins, with or without an ulcer, but more frequently when there is one, we sometimes meet with a blush on the surface of a mahogany colour, extending over a considerable space, and spots beyond resembling petechiæ, with much effusion into the subjacent cellular membrane, causing an œdematous state of the limb*. The constitution little affected, and the tongue, if furred, white.

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* Erythema læve of Bateman.

The character of this inflammation is subacute, readily yielding to suitable means, but if neglected it would no doubt ultimately terminate in mortification.

It is not to be confounded with the variety last described; for the anasarca is rather the consequence of the inflammation which precedes it, and bears a constant proportion to it, than the inflammation of the anasarca.

It seems to be mainly owing to the varicose state of the veins.

Rest, a raised position of the limb, and weak spirituous lotions applied tepid, with purges of supertartrite of potass. and jalap, will readily cure this.

Erysipelas Infantilis is a disease of which I cannot speak from experience. It appears to be generated by infection, acting either on the mother, (*vide* Dr. Bromfield's case, *Med. Com.*, vol. ii.) or on the child shortly after birth, and generated, as it should appear, in the air of a lying-in hospital. It certainly cannot be contended that it originates from disorder of the child's digestive organs, but it may from the mother's; and Dr. Garthshore remarks that the mother's indulging in spirituous liquors seemed frequently to aid its production.

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* Mr. Hunter describes the "œdematous" inflammation (vol. i. p. 474.) as only one kind. I should think the *varieties* now specified may be established with advantage.

In the practice of the British Lying-in Hospital, it was found that the use of bark internally, generally by clysters, and often combined with conf. arom., and the application of tepid and strong spirituous applications, succeeded best.

SUBGENUS II. *Paronychia gravis vel profunda.*

Analogies and differences between paronychia gravis and some forms of erysipelas.

There are many important differences between paronychia and erysipelas; yet, upon the whole, I thought the former would be with most propriety included in a Genus, whose leading character it is to terminate in sloughing and suppuration. There are, indeed, considerable features of resemblance between them, of which these constitute an important part, and the disposition to spread another.

The characters, as well as the production of erysipelas, are exclusively owing to the constitution; whereas, paronychia, although when of spontaneous origin, it owns a similar cause; yet may be, and often is, produced by accidents occurring to healthy individuals, and in both cases its progress is nearly the same.

Causes of its peculiar characters.

Like boil and paronychia mitis, it has a disposition to suppurate, but it is an inflammation so situated as to affect fibrous parts which readily slough, and is strictly confined by fasciæ, so that from pressure also it has a strong disposition to mortification, and to carry on all its processes unfavourably.

Either from the violence of the inflammation, its affecting sheaths of tendons, or the matter which is formed extending along them, the disposition is to spread, in which it differs materially from the P. mitis, and hence there is pretty clear ground for placing them under different Classes, and, of course, Genera.

I may be censured for arranging Species, or, it may be said, Varieties, of the same disease under different Genera and Classes;—but, in the first place, are they the same disease? A person shall have several whitlows in the last phalanges, at the same time, or in succession; or he may have two or more in the second; but I never saw an instance of the two kinds existing at the same time in the same individual.

Reasons for separating this form of paronychia from the milder species and placing them here.

I may be censured for separating them, because, as the *name* is the same, it may be liable to create confusion; but is it not the worst confusion to blend under the same title diseases very different? According to this mode of judging, it would be equally wrong to distinguish pustular ophthalmy from inflammation of the iris, or any other structure of the eye. If any thing is to be said about the name which still designates that paronychia which affects the middle phalanx, it is only in condemnation; for it is as perfectly inapplicable* as it would be to apply the term podagra to the gout in the hand. In truth, I believe the application of the same name, in this instance, to two very dissimilar diseases, has actually been productive of much mischief.

A disease of serious importance.

Judging from what I have seen, and have daily reason to observe, I should conclude that there are few diseases more destructive to the labouring classes than this; for their lives are not unfrequently compromised by its consequences, and their arms, hands, or fingers, often rendered entirely useless or lost.

Two kinds of paronychia gravis.

There are two varieties of paronychia mitis described by authors, and also two of this kind. In the first, the matter is said to form in the sheath of

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* Παρα ονυξ, near the nail.

That under the periosteum probably arises from necrosis.

the flexor tendons; in the second, under the periosteum. I should suspect that the latter are neither more nor less than cases of necrosis of the phalanx, inducing suppuration *there*, as well as in any other part of the body. The diagnosis is chiefly guided by the following circumstances: that the *hand* does not swell in the latter, and the progress is not so rapid and intense.

In both, the practice is nearly the same; namely, if we cannot prevent suppuration, to give the matter an early exit, the necessity of which, in the 1*st* Species, or that forming in the sheath of the tendons, is very pressing.

Resolution may be attempted in the beginning.

We may attempt to prevent the formation of matter in the very commencement, by leeches, ice, or golard, perfect rest and low diet being enjoined, a strong saline purge, and, if necessary, opium at night. Firm pressure has also been recommended; alcaline solutions; very hot water, *&c.*

If it fails, a free opening necessary.

If these means fail, it will be highly wrong to delay the opening, from which much harm, but no good, can accrue, and we should bear in mind the following points: 1*st*, that matter is generally formed by the third or fourth day; 2*nd*, that its existence will not be rendered evident in the finger till a much later period, when the mischief has been done; 3*rd*, that after this time any attempts to produce discussion are idle, and an opening must be made; 4*th*, that if done early it will prevent all the mischievous consequences; and, *5thly*, even if matter should not yet have formed, it will be of essential service, and much less painful now than later.

The incision should be free, and down to the matter, whether that be situated in the sheath of the tendon, or under the periosteum.

Conduct in cases far advanced.

When a surgeon has been called to a case of this kind, which has been allowed to extend to the hand and arm, matter being contained under the fascia, and the skin above it immensely loaded, there is still the same principle to be pursued; namely, to make free openings: but, now, it is not always so easy to say *where* they are to be effected. The whole hand appears equally swoln and tense; no point of selection offers itself; and no fluctuation can be satisfactorily distinguished. In such a case, a free incision should be made deep in the original seat of the disease till the matter fairly gushes out, which may, if necessary, be continued upwards to the head of the metacarpal bone supporting that finger; for we shall thereby give exit to the matter contained beneath the fascia of the hand, without risk of dividing the digital arteries, which might occasion serious hæmorrhage,—that is to say, it might proceed beyond what could be safely borne, though doubtless within certain limits it would be of use.

Manner in which openings should be made.

The points which *naturally* present themselves are the interspaces between the fingers; because here the fascia is deficient, and there is in all cases a protrusion of fat, much increased by the loading of inflammation, and, if the matter is also protruded at these places, as is often the case, there cannot be a doubt as to the propriety of selecting this situation; but if, as above supposed, this is not a matter of certainty, we might plunge in the knife, to the great risk of wounding the vessels which are here situated*. In the former situation we are safe; and, if it is desirable, we may probably be able to get a director under the fascia, and cut it up more extensively towards the wrist, which is a safer plan than that of cutting into the hand towards the palmar arch. Authors direct us to make openings in these cases, "*coute qui coute*," and they are undoubtedly right; but, if these can be made without incurring the risk which might arise from the division of a vessel which would be likely to bleed much, and perhaps seriously, under circumstances which undoubtedly render it a matter of great difficulty to secure it, it would be far better to pursue such a method than to cut at random; and I am more disposed to dwell upon this point myself, from having witnessed several instances of profuse, and even alarming, hæmorrhages from these vessels; and it is not long since I was desired to see a man who had lost a full chamber-pot of blood from one of the digital arteries, which had ulcerated in consequence of the inflammation and abscess brought on by a compound fracture of the second phalanx.

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* I put the nerves out of the question: their division is of little comparative consequence.

Above the wrist an opening may be made with confidence, midway between the ulnar and radial arteries, but even here I have known profuse hæmorrhage occur from cutaneous branches under inflammation.

The bread-and-water poultice, moistened with a solution of lead, to the hand, and cold freely applied to the arm, seem to be the best applications 'till the mischief has stopt. Then, and not till then, a day or two of fomentation and warm poulticing will probably improve the suppuration; but the practice of wrapping up these limbs indiscriminately in greasy poultices, has not been condemned without good reason.

Genus IV. *Char.* Disposition to phagedænic Ulceration and Sphacelus.

Species 1*st.* From venereal poison.
2*nd.* —— mercurial poison.
3*rd.* Gangrena nosocomialis.
4*th.* Sphacelus in the labia of female infants.

The three first owe their origin to morbid poison, and are exceedingly rapid and destructive.

These, with the exception of the last, owe their origin to the influence of morbid poisons; and it may be observed, that two of them may be produced either directly from the local application of the matter, or its introduction into the system; *i. e.*, the venereal phagedæna and gangrena nosocomialis. They are acute, and often horridly rapid and destructive in their progress.

General description.

The skin inflames around the ulcer from which they proceed, and the inflammation extends itself widely; its cellular texture loads with fluids, as well as the parts below, and becomes tense; the pain and sensibility very great; the skin ulcerates away with frightful rapidity; the subjacent textures slough; and a profuse ichorous discharge takes place from this ulcer, increasing the irritation. Every action in the part is morbid—there is no attempt at repair.

The constitution, already disordered by the influence of the poison, sympathizes in proportion to the degree of mischief and danger; excessive vascular action takes place, which, as the vessels of the part are incapable of effecting the repair, only serves to increase the evil. Such are the leading characters of the general and local affection in this description of cases. It is not my intention, because from my own experience, it is not sufficiently competent for me, to enter particularly into the separate nature and treatment of these affections. I shall, therefore, only offer the general principles which it seems rational to adopt in the management of such diseases, and which are practically found to be the best.

Treatment general.

The increased vascular action is such, that it greatly tends to augment the mischief, and is the first thing which requires reduction, and a copious bleeding is generally of the greatest service, particularly in the outset; this it may be necessary to repeat according to circumstances; but there is a time when it becomes injurious, and there are cases in which it may be improper even in the beginning. Saline draughts in effervescence, and tartrit. antim. are also useful; the former as refreshing and calculated to correct morbid poison, the latter as tending to reduce vascular action.

Another leading indication is to purify the blood; for it is to be borne in mind, that the cause of all the mischief is the impregnation of the blood with morbid matter, which irritates and injures the nervous system, and prevents the vessels in the inflamed part from acting healthily. The object of depletion is to check the excessive actions till the system is relieved from this cause, as well as to aid in relieving it. It is a main object to expose such a patient to abundance of cool, dry, and pure air, if possible. Secretions should be procured from the skin and bowels by such means as will not irritate. Small doses of opium, or of hyoscyamus, are also useful in checking the excessive irritability; and a full dose of opium at night properly guarded is often required, although not in all persons equally serviceable.

When by depletion and other suitable means we have reduced the violence of action, the disease may still remain unsubdued, and the loss of power induced by the treatment may be calculated to increase it. To use Mr. Travers's expressions when speaking of an inflammation in the eye, which I cannot help thinking in many respects similar in its nature to those which we are now considering: "When inflammations in their nature destructive, are arrested by the vigour of the means employed, the system stands in great need of the power thus lost, for its recovery to restore parts partially injured, and to supply the place of those which are destroyed*."

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* Travers. *Synopsis of Diseases of the Eye.*—P. 267.

I shall also take the liberty of extracting from the work I have just quoted, the author's statements with respect to this, the acute suppurative inflammation of the conjunctiva; because, granting the analogy, the information is most important, since the indications of treatment to be met with in the modern works on inflammation of most authority are either peculiarly indecisive on this point, or they deny the efficacy of bark and tonics, or pronounce them injurious.

"The vehement acute suppurative inflammation is sudden in its attack, accompanied with most severe darting pains; the upper lid is in a few hours prolonged upon the cheek, owing to the infiltration and enormous swelling of the tissue connecting the conjunctiva to the tarsus. The cornea is nearly concealed by the fold of conjunctiva, which overlaps it all around, and the corneal surface is dusky. The system sympathizes, chilliness is succeeded by a hot and dry skin, and the pulse is frequent and hard. The instant relief of a large venesection is indescribable. The pain is mitigated, if not removed; the pulse softened, and the patient sinks into a sound sleep and perspires freely. Upon inspection, we observe the high scarlet hue and bulk of the chemosis sensibly reduced, and the cornea has a brighter aspect."

"But it is rarely that a single blow suffices to vanquish the disease, especially where it arises, as is most frequently the case, from the contact of morbid matter." "With large blood-lettings repeated, subject to the discretion of the practitioner, until the inflammation yields, a brisk catharsis should be combined, and this followed by a teaspoonful of a solution of emetic tartar every hour, so as to keep up a state of nausea, perspiration, and faintness." "If, when the lowering plan has been pushed to the extent of arresting acute inflammation, the patient being at the same time sunk and exhausted, the cornea shews a lack lustre and raggedness of its whole surface, *&c.*," "the portion so marked out will infallibly be detached by a rapid slough, unless by a successful rally of the patient's powers, we can set up the adhesive action so as to preserve in sitû that which may remain transparent."

"To know how far to go, and not outstep the boundary; to know when to venture upon a short and sudden reverse of treatment is the great difficulty of this highly important case." P. 265 *et seq.*, and p. 119, he mentions one of these cases where by "the highest tonic regimen, bark, wine, and opium, followed close upon a very active and bold depletion, the anterior chamber was fortunately and unexpectedly preserved."

Such has been the disrepute into which bark and tonics generally have fallen, that it appeared almost necessary to meet this general censure with some high authority, and such I must consider Mr. Travers's to be. Of their use I have no doubt; the difficulty is to seize the fitting case and fitting time.

Of gangrena nosocomialis such excellent accounts have lately been given by authors whose means of observation are equal to their talents, that I shall not take up any time unnecessarily on this subject.

Venereal, and the mercurial phagedæna, may exist independently of one another; but it more generally arises from the effect of the medicine increasing the effect of the poison, instead of destroying it; either from the nature of the case, or constitution in which it is employed, or the manner in which it is administered. At all events, during the state of increased general action, the use or continuance of mercury is highly injurious; but there are some medicines which appear to possess an undoubted efficacy in preventing or curing the effects of both these poisons, particularly sarsaparilla and nitric acid; these will not supersede the means which have been mentioned in cases highly acute, but they are decidedly useful in those which are not so, or those which are protracted. I have indeed heard nitric acid extolled as a specific in these cases, but I have not myself seen it answer such expectations.

Where bark agrees, and it is given at the proper time, much may be hoped from it; but where it disagrees with the stomach, it must be given up, and when it has answered the purpose, *i. e.*, established the adhesive action, it does not seem desirable to continue it, unless there is profuse suppuration; it ought to be properly combined, and I believe it is the best plan to give it decidedly for a short time.

Local.

Local remedies are highly important. In the very acute stage, I believe, bathing the ulcer frequently with tepid water or decoction of poppy heads, and applying poultices made either with the lotio opii or simple water, is the best plan to pursue. Afterwards, nitric acid lotion, fresh lemon-juice, acetous acid, fermenting poultices, charcoal, bark, decoction of bark and wine, solutions of argent. nitrat., hemlock, *&c.*, may be tried. But none should be continued which renders the sore more painful, and they should be carefully watched.

Observations on local remedies.

It seems a favourite argument with many authors, that where a number of remedies are recommended, none are in reality useful, and the amendment, when it does occur, they say ought to be ascribed to nature; however, when I see a sloughing sore, which has been painful and spreading for days, amend in one night and become easy upon the employment of a particular application, and alter its character again upon its being discontinued, I am compelled to believe it has been useful; and the result of experience in common ulcers amply confirms the conclusion: the desideratum in the present instance is to know what application to use in a particular case; for while we are trying a great many, the time for doing good may be lost; and what is worse, we may be teasing our patient by a succession of fresh irritations; and this is so often the case, that I am almost disposed to believe that until the practice in each case is better settled than at present, it would be the wisest plan upon the whole, to adhere generally to the soothing mode, but having recourse to others where this notoriously fails, or reason or experience clearly points out a better, and being governed by this caution, that we do not persist in the use of any thing which increases pain and does not evidently prove serviceable.

Mortification, or Phagedænic Ulceration of the Labia.

Drs. Garthshore and Underwood have described an *erysipelatous* affection of a very serious nature, which attacks children newly born who have been exposed to the unwholesome, and perhaps infectious, air of lying-in hospitals; vide p. 272.

Mr. Kinder Wood's description.

Mr. Kinder Wood has since given an interesting paper in the seventh volume of the *Medico-Chirurgical Transactions*, on a disease incident to the labia of female children from one to six years old, and which seems to have proved uncommonly fatal. He mentions having seen twelve cases, of which ten died; but he ascribes this extreme fatality in a considerable degree to these patients not having received proper care and early medical attendance.

A very disordered state of health, with fever, precedes for about two or three days the appearance of an inflammation resembling erysipelas on the labia, one or both, which is shortly followed by an eruption of aphthous vesicles extending along the perinæum to the anus, and to a considerable distance around, terminating in deep ulcerations, which continue to spread till the little patient is destroyed.

It differs from E. infantilis in the age, in the situation, in the sex (being always in female children), and in the result of treatment, this not bearing stimuli, which are very beneficial in that.

The paleness of the countenance is marked and peculiar, the bowels torpid, the stools dark and unhealthy.

There is extreme pain in voiding urine, so as to cause the child to retain it for a great length of time.

In one case only he saw it produce mortification instead of ulceration.

His *local* plan of treatment is by bathing the part in a tepid lead lotion, and applying bread poultices made with the solution of lead; and when the ulcers clean, dressing them with an ointment made with the white oxyd.

His *general* plan, by laxatives of calomel and rhubarb, or senna; and as he considers it an inflammation of low character by giving bark, confect. arom., and support by diet.

Cases of sloughing of the labia the author has met with.

Having stated thus much, I must now say, that I have myself met with four cases, which I conceive to be in a considerable measure analogous to those described by Mr. Wood; but in three of them a considerable slough formed; they all did well.

The First. Mary Davey, *æt.* 13, was a physician's patient in the hospital, with pulmonary complaints and extreme disorder of the health; a slough having formed of about the size of half-a-crown on the left labium with considerable surrounding inflammation, I was desired to see her; her general health improved under the use of the medicines Dr. Daniell ordered; camphorated spirit was applied on lint, and a poultice over it; she soon got well.

The Second. A daughter of a master bricklayer, about nine years of age, in comfortable circumstances, had a similar slough in a similar situation, but far more irritable; her health disordered, as Mr. Wood describes. Poultices made with the opium lotion were applied at first; and when the slough separated, the foul sore which remained was dressed with equal parts of port wine and decoction of bark, under which it cleaned and healed; proper purgatives and light tonics were given.

There was an utter impossibility of voiding urine in this case, and I was obliged to draw it off for two or three days.

The Third. A little girl, about four years old, was the patient of a medical gentleman in this city, who was so obliging as to ask me to see her. She had been ill a considerable time, and had an immense phagedenic ulcer, which had destroyed a part of the labia, the perinæum, and the septum between the vagina and rectum; she recovered under the use of fomentations made with decoction of oak bark and dressings of bark ointment, proper support, and opium.

The Fourth. A child of the name of Yarde, *æt.* 18 months, was lately brought to me, with a superficial slough on the left labium about the size of a shilling; there were some aphthous vesicles around it; it was thrown off in a few days, and healed under the use of a poultice made with the lotio opii; mild stimuli were tried, but proved injurious; she also had gentle purges, with hyd. cum creta, and rhubarb.

GENUS V. *Char.* Disposition to Mortification.

Species 1*st*. From pressure in unsound constitutions, in old people, or in others during fever, or other diseases.
2*d*. From the effects of poverty, scurvy, *&c.*
3*d*. From the use of unsound rye as food.
4*th*. From disease of vessels.

The inflammations of this genus have a direct tendency to mortification, so strong and immediate as, in many cases, to be scarcely perceptible before the occurrence of that state, particularly in the *fourth* species. They seldom increase with any great degree of rapidity until towards the end of the scene, when the general sympathy is much excited, and speedily leads to fatal consequences in a great number of instances, the powers of the system being of necessity very weak. General character.

It may be observed of this genus, that the skin is primarily attacked with mortification, in the *fourth* it ulcerates.

Spec. 1*st.* ***From Pressure,*** in bad constitutions, old age, or during fever, or other disease.

Effects of pressure in healthy constitutions.

When parts are quite healthy, and the constitution is so too, (which is perhaps essential to the former), pressure will very rarely induce sphacelus. The first endeavour of nature is to re-establish the circulation, notwithstanding the obstruction; hence the part reddens, and if it can it swells; but if this purpose cannot be effected, either the part pressed upon is rendered callous, or, if this cannot be accomplished, it is removed by the absorbents, an ulcer being formed; and as the part is healthy, this ulcer will be a simple loss of substance, with a surface secreting good pus, and ready to granulate healthily if the pressure be removed; and, if it does produce sphacelus, this will have little disposition to spread*.

In unhealthy.

But if the parts are unsound, or the constitution disordered and weak, it will generally be removed by mortification, or will partly ulcerate and partly mortify; and the ulcerative inflammation will be far different from that which we may observe when the parts are healthy.

Use of the slough.

The slough formed defends the sensible parts beneath in a great degree from the further effects of pressure, and it separates very slowly. It generally extends through the whole of the parts pressed upon, and sometimes further; but it does not often possess the disposition to spread.

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* Hunter. Vol. ii. 304.

Mortification from pressure in a healthy constitution will legitimately fall under the head of Mechanical Injuries; in the present case we suppose it to be unsound, either in chronic cases, such as diseases of the hip, spine, or in dropsy; or in acute, as typhus or compound fracture; or it may be simply weak as in the very aged.

It is remarkable that this mortification has not more disposition to spread.

In the second description of cases, it is not a little singular that it should have such little disposition to spread; for, as mortification, when it occurs as an original disease, is attended with fever approaching often to a typhoid character, we might *à priori* expect, that originating from pressure, or any cause, during such a state, it would be greatly disposed to spread, which is often not the case; when, however, it does so, the fate of the patient is thereby greatly accelerated.

Treatment.

It is our duty to prevent the formation of sloughs by avoiding pressure on parts *likely* to suffer; and if inflammation has commenced, it may be treated by bathing it in a little warm camphorated spirit, and applying some soap cerate*. When sloughs have formed, I believe, pledgits of the warm digestive, covered with linseed poultices, or the fermenting poultice, are the best applications; and when the sloughs have separated, a very favourite application in our hospital, the bals. copaib. on lint.

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* When inflammation or excoriation are the result of the irritation of acrid secretions, (often combined with pressure), bathing it in warm water, and applying the ointments of zinc or lead, constitute the most proper plan.

This form of mortification is often of very serious consequence; for there are many lives lost in the latter stages of fevers and other acute diseases, which, by early attention to prevent this mischief, might have been saved.

Spec. 2d. From the Effects of Poverty, Scurvy, *&c.*

Mortification may proceed either from simple debility, or from debility connected with an impure state of the blood.

When it arises simply from debility, it occurs in those persons who have not sufficient strength to support an upright posture, and it takes place in those parts which are pressed upon, and may therefore be considered under the last head; but pressure will prove a cause of mortification where there is no debility, and debility will occasion it under a very trivial degree of pressure, and this often happens in the aged and those exhausted by disease.

But there is a species of mortification, which occurs to all ages, independently of the influence of any external cause, in persons who are depressed, exhausted, and disordered by insufficient and improper food; who are plunged into a state of abject poverty and distress, particularly if they have impaired their digestive organs by the use of spirituous liquors; but, although the weakness in these cases is often great, yet it is far from sufficient to account for the appearance of gangrene on the tips of the ears, nose, toes, fingers, *&c.*, with which these wretched objects present themselves at our hospitals. They are rather owing to the impure state of the blood, and are often accompanied with petechiæ, bleeding gums, and indeed many symptoms approaching to scurvy.

The disposition to spread is not great; and if moderate warmth and a light nourishing diet can be obtained, the sloughs soon separate and the patient does well.

Spec. 3d. From the Use of unsound Rye as Food.

The effects of this substance are truly remarkable, and Dr. Thompson's work on Inflammation contains a very excellent statement of the facts which have been published respecting it. It seems to be analogous in some degree to the mortification produced by poverty and improper food, and it seems to deserve a place by the side of these.

A state so peculiar, induced by a particular kind of aliment, must be considered as owing to a change produced in the blood; and in addition to many others, such as sea-scurvy, *&c.*, strongly tends to support the truth of the humoral pathology, if not to the full extent credited by the ancients, at least further than is conceded by the fashion of modern times. The effects produced by a vegetable diet on carnivorous animals, as appearing in the experiments made by M. Majendie are also very analogous.

Spec. 4th. From Ossification, or other Disease of Vessels.

The cases of mortification to which I now allude are those which have been so admirably described by Mr. Pott*.

There seems great reason to believe that this kind of mortification arises from a diseased state of the vessels, *often* connected with ossification, which indeed has of late, and on high authority†, been accounted its cause, although Mr. Pott is of a contrary opinion. It is certain that this disease is generally found in those whose arteries are so affected; but, on the other hand, it must be remembered that we have facts enough before us to prove, that mortification is no necessary result of an impediment in the principal channels. I should be more disposed to believe that the defect is in the minute vessels themselves, less obvious to the senses than that of the larger branches, but not to be rejected on that account, for the same causes which would be likely to induce disease in the one set, may not improbably do so in the others, and the decayed state of the body, generally indicated by the loss of hair, teeth, *&c.*, and the dull colour of the extremities marking defective circulation, together with the very peculiar appearance of the countenance, seem to render this probable. Mr. Pott, who was so keen an observer must have met with many instances in which there was not ossification, or he would not have advanced the assertion. The following very curious case seems a further example; for the opportunity of seeing it I am indebted to the friendship of Mr. Johnson of this city.

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* Cases occasionally occur in the legs of elderly men of a similar stamp, in which the skin at the edges mortifies in spots and repeatedly, and ultimately may prove fatal.

† Hodgson. *Diseases of Arteries*, &c.—P. 41.

It seems to proceed immediately from a diseased state of vessels which is often connected with ossification in the larger trunk and branches.

Dec. 1820. M. Walker, *æt.* 42; a woman whose face and a considerable part of the body is covered with a scorbutic eruption, and whose gums seem to have suffered from the same affection, has been feeble and sickly all her life.

Interesting case in which there was no ossification.

Eighteen years since she had mortification of the little finger of the left hand, which extended to the bone, and it then appears that she was treated with stimuli and good support. Since that time the fore finger and thumb have been always liable to ulceration if not covered with plasters, and her feet tender and liable to vesications; her hand very often painful; the circulation not natural; for, to use her own expressions, when dying with cold in her feet and hand, she has been covered with perspiration on her face and chest. For some years she has been subject to palpitation, but the state of her pulse does not intimate any organic disease of the heart; nor is there the least *feel* of ossification or thickening of the radial artery; and still more, Mr. Johnson, who lately removed one finger, assures me there was no trace of ossification therein; an authority not to be questioned.

A few weeks since, when I saw her, three or four fingers and toes on each of the left limbs were sloughing, inflammation was extending up the hand and wrist, and the right foot had one toe beginning to slough, (the right arm terminated at birth just below the elbow); in short she was in a most distressing situation, and suffering great pain. The ravages of the disease are *now* completely arrested, and she is left with a part of the little finger and thumb of her *one* hand and three toes of the left foot, and all those on the right, and the ulcers where they have separated are nearly healed. This improvement is to be attributed to the use of opium, bark, and wine, with which the humanity of Mr. J. has liberally supplied her. She attributes much to the opium, which has relieved the pain, and she feels does her good: she has taken six grains in the twenty-four hours.

This horrible state of sloughing came on about five months since, and began in the hand.

She is married, but has had no family, and has now ceased to menstruate two years. She has half brothers and sisters, who are healthy.

Mr. J. tells me he has observed eruptions in other cases of this affection.

Vessels so circumstanced, appear no longer to possess their ordinary powers of repairing injury or disease.

This mortification is probably not so much the result of the ossification as the generally-impaired state of the vascular system, of which that is one consequence; and it would appear that the vessels, under these circumstances, have lost their common powers of repairing injury.

Case.

"I have at this moment under my care, an old man, who has a large ulcer on the dorsum of the foot, which has spread gradually from the root of the great-toe, amputated *three years ago* on account of mortification of this kind, since which it has never healed, although every endeavour has been used, both by my friend and colleague, Mr. Barnes, under whose care he was placed shortly after the toe had been removed, and more recently by myself, he having been, after a long interval, re-admitted under me.

"There is a large deep ulcer of about one inch and a half by one inch, with hardened white edges, and a glassy bottom *in which there is not a trace of a granulation to be seen*, and there is commonly a piece of loose slough towards the upper edge, which is slowly giving way. It has not in the least the character of cancer, or any species of *incurable* ulcer, and the pus secreted is tolerably good; the pain considerable, and, indeed, if any dressings are employed which do not accord with the sensibility of the part, exquisite; and when irritation is produced by any cause there is a considerable degree of œdematous erysipelas surrounding it. He is fifty-nine years of age; rather spare; complains of no other malady, but the arterial system is universally diseased. The radial artery of the right limb is converted into a tube in which no pulse can be felt. The femoral artery on the side of the foot affected; where it quits the abdomen, is also a large hardened tube in which pulsations can be with difficulty perceived, and lower down they are entirely lost. On the left side the radial artery can just be distinguished. The principal difference which the man can perceive between the two arms, is, that one grows cold sooner than the other, and is frequently affected with tingling. There seems no other reason for the sore not healing, but the vessels being incapable of effecting the process of reparation."

This was written in the autumn of the year 1818; soon afterwards I discharged him, as incurable; and in the severe winter of 1819, he died.

These case sometimes remarkably slow in their progress; at others very rapid.

These cases are sometimes very rapid in their progress; and, instead of proving destructive after a duration of weeks, months, or even years, they put an end to the patient's existence in a few days; such are the cases which sometimes occur in the luxurious and wealthy, after cutting a corn, or inflicting some slight injury, on the foot.

They do not always terminate fatally, but it sometimes happens that there are powers of constitution to arrest their progress, and the feet separate at the instep or at the ankle, and people have been known to survive the process many years.

Progress in most cases.

In general, however, the progress is as follows: For a time, the mortification spreads, and then is arrested by adhesive inflammations. We are led to hope that the dead parts will be thrown off, but it seems as if those nearer the centre were incapable of completing the work, and the inflammation and sloughing commence anew; the countenance becomes more and more haggard; an increased degree of pyrexia is induced; and perhaps the patient may now sink, or it may again stop, and again go on in a similar manner, till death ensues*.

Treatment. The plan of treatment recommended by Mr. Pott, is the free use of opium in divided doses, and the application of emollient fomentations and poultices, which sometimes does succeed in arresting the mischief, though in the cases I have witnessed, by no means so frequently as we might expect from his account.

A steady and well-directed plan of support will give the best chance, when the disease has stopt, to enable the adjacent parts to throw off the dead. Mr. Abernethy informed me, a short time since, that he had been induced to apply the adhesive straps, in a case of this kind, after other means had failed, and with success.

Question of amputation. If we find these cases disposed to extend by successive sloughing, notwithstanding all our endeavours, what conduct is to be pursued? The patient is left with the alternative of amputation or death; and the former offers but a very precarious chance of escape. Of course the degree of probability of the patient's doing well, will depend upon the state of his vascular system, whether very much diseased or not,—his remaining stamina,—and his means of being able to support himself with the comforts his remaining period of existence will require.

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* The mortification induced by disease of the heart, or large vessels, seems to be of the same kind.

The probability of the operation succeeding, is grounded upon the fact, that, higher in the limb, the powers of the parts may be equal to the repair of a large wound, although below they are incapable of throwing off a slough. Under these circumstances, it appears to me to be the duty of a surgeon to state fairly and explicitly to the patient and his friends the state of the case, and leave them to decide what shall be done.

To be decided by the patient and his friends, on a fair statement by the surgeon.

If it should be determined that the operation is to be performed, the following case is well calculated to hold out some hope in apparently most desperate circumstances:

A very unfavourable case in which it succeeded.

J. Webber, *æt.* 68, was admitted a patient of the hospital in April, 1817; the left foot having mortified as high as the ancle, after repeated attempts to limit, and throw off the dead part. The effects of age had been increased by free living at an earlier period; his arteries generally were thickened; his hands, the right foot, and face, were of a dusky colour, approaching to livid; and the blood, pressed out of the small vessels, returned at a very tardy pace: he was thin, sluggish, partly deaf, and toothless.

Such a man, perhaps, held life by a valueless tenure, and it might rather be deemed cruelty than kindness to arrest his progress to the grave; but he suffered extreme pain, and I felt it my duty to tell him what alone could be done (for opium sufficed only to mitigate it), but fully stated the objections. He did not hesitate to desire that amputation might be performed, more actuated, I believe, by the hope that the operation would terminate his sufferings, than anxious to escape from death; and he would not have cared if they had ended on the table with his life. From all the circumstances of his case, his age and infirmities, such an event was by no means improbable; but I guarded against it as well as I could, by giving him a considerable quantity of brandy-and-water, and laudanum, before I commenced.

I chiefly grounded my hopes of its succeeding upon the firmness and steadiness of the pulse.

One ground of apprehension was, that the arteries might have been found in such a state as to endanger the success of the ligatures. To lessen this as much as possible, I amputated in the thigh; and, although the femoral artery was much thickened, it so happened that every thing succeeded in this respect. Several vessels bled freely, which I was rather pleased to see, and required ligature.

It would occupy too much time to relate the various circumstances which subsequently occurred, although sufficiently interesting: it may be sufficient to say, that, after being for a long time in a very perilous state, he ultimately recovered.

For the first few days he approached to that condition which is by Mr. Hunter termed Dissolution.—There was constant tremor and subsultus,—muttering delirium,—and the sweat of relaxation: however, by constantly supplying him with wine, brandy, opium, and suitable nourishment, at short intervals, he was kept up.

I expected to have seen the stump slough, but this did not happen excepting in two or three patches of skin which were more exposed to pressure than the rest; the suppuration, however, was bad, and there was much disposition to the ulcerative inflammation.

The dressing, applied after the first days, was lint, dipped in equal parts of decoction of bark and port-wine,—an application I have frequently found very useful where a grateful stimulus is required and the parts want tone.

This man was discharged in the autumn of 1818, and lived till the winter of 1819-20, when he sunk under the cold of that very severe season.

NOSO

NOSOLOGICAL

In which the inflammat

In pyrexiæ of an asthenic nature

In the vascular system,

1st

2n

3r

In extern

Genus I. *Char.* Disposition

Sub-genus a. Superfici

Sub-genus b. Catarrhal

Genus II. *Char.* Dispositio

Spec. Inflammation

Genus III. *Char.* Dispositi

Sub-genus I. Erysipela

Spec. 1*st*. Erraticum

2*nd*. Phlegmo

a. Ver

TABLE OF INFLAMMATIONS.

CLASS SECOND,

ion spreads from the disposition to limit being deficient.

ORDER FIRST.

In vital organs, *e. g.*

, as typhus, puerperal fever, measles, scarlatina maligna, small-pox, dysentery, in aphthæ, *&c.*

. In absorbents,
l. veins,
l. arteries.

ORDER SECOND.

al parts, or those of secondary consequence.

to produce a temporary increase, and morbid state of the secretions of the part, and to resolve.

al inflammations of the skin. (Cutaneous inflammations.)

l inflammations of mucous membranes.

n to unhealthy suppuration.

of *1st.* Cysts of chronic abscesses
2nd. bursæ
3rd. tumors when open.

on to resolve, or to suppurate and slough.

s.

l.

nodes.

um.

with inflamed absorbents

APPENDIX.

APPENDIX,

No. I.

THE following may be considered rather as lists of those inflammations which have been treated of by some of the most approved modern surgical authors, than as offering any arrangements of them upon principle.

Dr. Kirkland, in his *Medical Surgery*, after speaking of the causes and nature of inflammation generally, treats of the following kinds:—

- Simple inflammation of the skin.
- Erysipelas.
    - local.
    - critical.
    - phlegmonoid.
- Phlegmonoid rheumatism.
- Gout.
- Inflammatory œdema.
- Ophthalmia.
- Phlegmon and abscess.

Abscesses requiring particular treatment.

- under the aponeurosis of the temporal muscle.
- in the lachrymal sac and duct.
- of the cornea.
  - antrum.
- lymphatic abscess in the antrum.
- in the chin.
- in the throat. Angina interna.
- in the axilla.
- in the mamma.
  - *1st.* Encysted. *2d.* Common. *3d.* Glandular. *4th.* Chronic and lymphatic.
- psoas.
- about the anus.
  - *1st.* Common inflammation. *2d.* Inflammation at the side of the gut. *3d.* Large critical abscess.
- in the perinæum and scrotum.
  - testicles.
- under the fascia of the thigh.
  - foot.

Paronychia.

Carbuncle.

Phlegmonoid œdema terminating in inspissation.

Gangrenous abscesses,

a. about the anus. *b.* about the foot and toes in old people.

Strumæ.
Swelled glands.
On the dyshymeny, or sero-purulent abscesses.
    abscesses of the joints.
    lymphatic abscesses, (inflamed bursæ.)

Mr. Pearson proposes "to consider an inflammation as an homogeneous disease, possessing one determinate character;" and he also adds, "when it is further considered that the indications of cure in every true inflammation are nearly similar, the propriety of multiplying species will be rendered extremely doubtful."

He treats of the following separately:

Mammary abscess.	Chilblain.
Paronychia.	Burns and scalds.
Lumbar abscess.	Erysipelas and zona.
Gangrene and sphacelus.	Œdema.
Carbuncle.	

Mr. Burn divides inflammation into the valida, debilis, and assuefacta. He does not enter into any regular description of different species, but for the most part speaks generally of inflammation and its treatment, or rather of the three kinds mentioned above and their treatment. He, however, gives an account of inflammation as situated in the brain, eye, lungs, stomach, intestines, urethra, and bladder; glandular parts, skin, and cellular membrane; bones and muscles.

Dr. Thompson divides inflammations into the acute and chronic, simple and specific, sthenic and asthenic; and he treats of the different modes or terminations of inflammation, adhesion, suppuration, ulceration, and mortification. He describes the effects and phenomena of inflammation as they appear in different organs and tissues; he treats in particular of inflammations from excessive heat or cold, and of hospital gangrene; but the value of Dr. Thompson's work chiefly seems to depend upon the excellent views it contains of the general principles of treatment; he expressly laments the want of arrangement now existing.

Mr. S. Cooper. In the last edition of his *Surgical Dictionary*, which, as his most recent work which treats of this subject, and as the most comprehensive, and indeed generally speaking, as the most authentic and valuable digest of British surgery hitherto published, I prefer quoting; besides an excellent disquisition on inflammation generally, and exclusively of those species which owe their origin to mechanical or chemical injury, to scrofula or other specific causes, and those situated in the organs of sense, separately describes the following:

Abscesses in the antrum.

about the anus; *i. e.*,

1*st*. Phyma.

2*d*. Erysipelas.

3*d*. Gangrenous abscesses.

The fourth without denomination, but it seems to correspond with chronic boil.

Inflammation of bursæ.

Carbuncle.

Chilblains.

Eczema mercuriale.

Erysipelas.

a. phlegmonodes.

b. bilious.

c. local.

Furunculus.

a. acute.

b. chronic.

Herpes.

Gangrena nosocomialis.

Phlegmonous inflammation.

Lumbar abscess.

Mammary abscesses.

Hernia humoralis.

Urinary abscesses.

Inflammation of veins.

Paronychia, four kinds; *i. e.*,

Two in the last phalanx, one in the second phalanx, in the sheath of the tendons, and one in the same phalanx under the periosteum.

Boyer treats of

- Inflammation generally.
- Abscesses generally.
    - phlegmonous abscesses.
    - cold abscesses.
    - abscesses by congestion.
- Gangrene in the order mentioned Appendix No. 3.
- Burns.
- Of the inflammation attending mechanical injuries.
- Of that consequent on the stings and bites of venomous animals.
- Of erysipelas generally.
    - in the face.
    - of fistulous erysipelas, zona or zoster.
- Of phlegmon.
    - boil.
    - anthrax, the mild and malignant.
    - inflammatory diseases of the organs of sense, bones, joints, testicles, mammæ, *&c.*

The above sketch may probably be considered as exhibiting a tolerably fair view of the manner or order, (if we may use the term), in which the various kinds of inflammation are arranged in those modern systems of surgery which are in most repute in this country and in France. In the various celebrated *nosologies* which have been published at different times, we find arrangements of inflammation which to me appear eminently defective. Many we meet with divorced from those to which they are naturally allied, from the consideration of some circumstances to which leading importance has been attached, although, as it should appear without sufficient reason; and they are collected into groups with other diseases from analogies of little comparative value: thus in Sauvage's we find anthrax, cancer, and paronychia, brought together in the order maculæ. In Linnæus's classification we meet with ophthalmia grouped with hemicrania and cardialgia in the order intrinseci. In Vogel we find rheumatism in the same order (dolores) with stone and colic; and Cullen arranges bubo and hydrarthus in the same order with cancers, aneurysm, and verruca (tumores), *&c. &c.*

APPENDIX,

No. II.

To the remarks I have already made on the question, whether debility of the capillary vessels is the final cause of inflammation, I wish to add the following:

1*st*. Is it not improbable that the same cause would induce debility of one set of vessels (capillaries), and increased action of another (arteries)?

2*d*. If the action of the larger arteries which, according to this supposition propels the blood, be increased in inflammation, why should the motion of the blood in the capillaries *be* slower, or even arrested altogether?

3*d*. If the arteries contracted to propel the blood, would they not feel hard while contracting, soft when dilating?

4*th*. The chief data upon which Dr. W. Philip and Dr. Hastings argue, are derived from experiments made on the membranes of living animals with stimulating fluids, alcohol particularly. The general result of these experiments has been already stated, p. 29, as reported by them; and from these it should appear, that diminished redness and increased circulation were the immediate results; increased redness and diminished circulation the further consequences of such applications. Now the conjunctiva of the human eye is a membrane as freely exposed to observation as any that can be mentioned; but if we apply an alcoholic stimulus (vinum opii, for instance), to this, we find it *immediately* reddens without going through any intermediate stage, a phenomenon at variance with those which have been observed in the experiments alluded to. What is the inference?—that from this and many other facts of the same nature, we should be led to form any conclusions in this matter not without great caution and distrust.

5th. With respect to the increased temperature in inflammation, Dr. W. Philip was well aware that this phenomenon bears very strongly on the point in question, and he labours to explain it with his wonted talent and to his satisfaction on the data which physiology then offered*, but the investigations which have since been made in this department appear to me to render his conclusions exceedingly doubtful, to say the least.

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* He says, vol. iii. p. 65. "On the supposition that the change induced in the blood is the only source of animal temperature, and we certainly do not much err in making this supposition."

My own belief is, that heat can be, and is, evolved by living animal matter; but that in animals having a circulation, the presence of blood properly ventilated is essential to excite the nervous system of the animal to develope it:—that an increase of temperature argues an increase either of its energy, or of the supply of arterial blood, or both; while a decrease argues the reverse. Now, although it by no means follows that an increased temperature in inflammation may not be the result of a morbid exertion of this energy leading to its consequent exhaustion, yet I should conclude that it can hardly consist with an actual diminution of those exertions at the time.

I have said (p. 24.), that if it be granted that inflammation depends upon debility of vessels, by consequence it would follow that it should be our endeavour to counteract this debility.

I am well aware that neither Dr. *Philip* nor Dr. *Hastings* depart from the well-known principles of treatment in inflammation, which practice has established; and they explain its beneficial effects upon their hypothesis, by saying, that it is calculated to reduce the action of the arteries, and thereby restore the balance of power upon which the healthy performance of the functions depend; and that this object may be obtained either by removing the debility of the capillaries or lessening the action of the arteries; I should fear that it might lead *others* to attempt the cure by the former means, as *either*, according to this hypothesis, is equally rational.

APPENDIX.

No. III.

ARRANGEMENTS OF MORTIFICATION.

BOYER.

Gangrene from External Causes.

1st. FROM the severity of the inflammation.
    Phlegmon.
    Erysipelas.
2nd. From contusion.
    a. Destroying the organization of the parts injured.
    b. Weakening their powers.
3rd. From slow compression.
4th. From burns.
5th. From congelation.
6th. From obstruction to the circulation.
    a. Obstruction to the flow of blood.
    b. return of blood,
        of lymph.
    c. From bandaging.

Boyer.

Gangrene from Internal Causes.

1st. From the malignity of the inflammation.
  a. Carbuncle.
  b. Malignant pustule.
  (It sometimes puts on the appearance of erysipelas.)
2nd. Supervening in the course of a malignant fever.
  a. In parts previously diseased.
  b. pressed upon.
  c. from the irritation of filth.
3rd. Dry gangrene.

Richerand.

1st. Gangrene from excess of action.
2nd. burn.
3rd. cold.
4th. excessive contusion.
5th. commotion.
6th. the action of a deleterious principle.
7th. the want of action.
8th. in old age.
9th. from defect in the circulating organs.

Hebreard, in *Dict. des Sciences Médicales.*

1st. Gangrene succeeding to acute inflammations.
  a. Anthrax.

- *b.* Gangrenous phlegmon.
- *c.* erysipelas.
- *d.* Pemphigus.
- *e.* Some inflammations of mucous membranes.

2nd. Gangrene succeeding to atonic inflammations.

- *a.* From scorbutic affections.
- *b.* lymphatic distention.
- *c.* contusions.
- *d.* burns.
- *e.* cold.
- *f.* paralysis.
- *g.* old age.

3rd. Gangrene from the action of deleterious substances.

Poisons:—

Animal.
Vegetable.
Mineral.

4th. Gangrene from interruption of communication between the part and the central organs

- *a.* Obstruction to the flow of arterial blood.
- *b.* Nervous fluid.
- *c.* Venous blood and lymph.

5th. Anomalous gangrene (under which he includes Mr. Potts' mortification).

Certainly this appears to be the best of the arrangements which have been offered; nevertheless, it is open to some objections. Thus, in the first place, all gangrenes succeeding to acute inflammations are classed together; but many of these widely differ from each other in nature, and in the treatment they require. Mortification from contusions and burns are considered as consequences of atonic inflammations: this is a point at least doubtful, and certainly, in the former instance, it would be dangerous to apply this principle in the treatment: it is also very clear that there is a wide difference between them and the others in the same division.

M. QUESNAI divides gangrene into the moist and dry, and then proceeds to say that the former may rise from the following causes: *i. e.*,

Contusion.
Stupefaction.
Infiltration.
Strangulation.
Bites of venomous animals.
Inflammation.
Congelation.
Burn.
Putridity.

But to present any thing like a digested scheme of his work, would require an analysis of considerable length: suffice it to say, that with respect to inflammation, he altogether denies that pure inflammation will produce mortification—"it has not heat enough;"

241—277; there must be some malignity in its nature, or acrimony in the humours.

I believe, myself, that the best mode of considering mortification upon the whole, as I have, indeed, before stated, is as a termination of inflammation, and as such, that its different kinds will be with most advantage included under the heads in that arrangement: but the following may, perhaps, be considered as a pretty correct list of mortifications requiring a peculiarity in treatment.

1*st.* From contusions and lacerations.
2*nd.* From ligature and bandage.
3*rd.* From burns.
4*th.* From frost-bite.
5*th.* From chemical poisons; such as strong acids, alcalies, metallic salts, *&c.*
6*th.* From the stings and bites of insects and reptiles.
7*th.* From carbuncle and carbunculous abscesses.
8*th.* From erysipelas phlegmonodes biliosum.
9*th.* From erysipelas œdematodes biliosum.
10*th.* From erysipelas consequent on anasarcous distention.
11*th.* From paronychia gravis.
12*th.* From venereal poison.
13*th.* From mercurial poison.
14*th.* Gangrena nosocomialis.

15*th*. Phagedenic ulcer or mortification in the labia of female infants.
16*th*. Pustule maligne. 2. Pemphigus?
17*th*. From pressure in unsound constitutions, *&c*.
18*th*. From the effects of poverty, scurvy, *&c*.
19*th*. From disease of vessels.
20*th*. From the use of unsound rye as food.

If, indeed, there are so many kinds of mortification, or of inflammation terminating in mortification, which appears from the most careful consideration to be the case (and perhaps there may be more), each of which requires some modification of treatment, and many—a plan totally dissimilar, it will follow, that although general disquisitions on mortification are highly useful, yet they are far from giving all the information which is practically required, and indeed without much caution and judgment may mislead.

APPENDIX.

No. IV.

SINCE these sheets were sent to the press, I have been much instructed and gratified by a perusal of Mr. Travers's work *On Diseases of the Eye,* which indeed is calculated in no small degree to improve our views in general pathology, as well as in the particular class of diseases of which he especially treats.

The remarks on inflammation are important in two points of view: first, with reference to the organ in question; secondly, to inflammation generally. The observations he has communicated on the use and abuse of blood-letting, seem highly deserving of attention, for there is no practice which in common cases ought to be more governed by the consideration of consequences, and not solely by the matter in hand, and where the surgeon ought not to purchase eclat at the risk of future danger or inconvenience to his patient. His remarks on the change from the depleting and soothing, to the tonic, plan of treatment, are extremely valuable; and it must be remembered that, as in the eye we have the advantage of inspecting the processes going on, *veluti in speculo*, observations made on its diseases have the value of experiments conducted in the most perfect manner.

SINCE this work was printed, I have discovered that in two instances remarks, which I certainly believed to be original, and have offered in such a way as to imply this belief, have been anticipated, and I am bound to acknowledge the fact. The first is respecting the inflammation which ensues in cavities after they have been opened, and which seems to arise not from the admission of air as has been contended, nor from the stimulus of imperfection, but simply from the extension of the inflammation from the wound in the skin; this argument I deduced from the phenomena which present themselves in compound fractures, and it formed a prominent feature in a paper on Fractures which I read to the Medical Society of St. Bartholomew's Hospital when House Surgeon in 1809; and I certainly was not at that time, nor since have been, aware, that any opinion so similar had been advanced as that which Mr. C. Bell published in his *Operative Surgery* in 1807; nor was it remarked during the discussion of that paper, although, as I well remember, it was honoured by the attendance of some gentlemen of high professional ability. The second I find also in the same work; it is the comparison of the two stages of ordinary contusions with the phenomena of what has been called concussion. If I had discovered these seeming plagiarisms before, I should not have advanced the opinions as if they had been my own; but I was only accidentally led to the discovery a few days since from a passage I met with in the *Med. Rep. for March*, 1821, p. 191.

I very readily surrender the credit which I conceive does attach to these observations to the gentleman who first suggested them; and at the same time I need express my own concern that I should have been ignorant of any part of a work so well known to the profession as that now alluded to; in truth, I have been often happy to refer to it for information on the subject of operations, but have not (I confess it with regret) perused the introductory part as I ought.

THE END.

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